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MAY 15 1930
DETROIT

Construction Methods



A MONTHLY REVIEW OF FIELD PRACTICE AND EQUIPMENT

General Construction · Highways · Buildings · Engineering · Industrial

I-R Road-Building Equipment Speeds Pennsylvania Highway Job

During an important road-building project, more than 30,000 tons of rock were recently blasted from the face of Weygadt Mountain, near Easton, Pa.

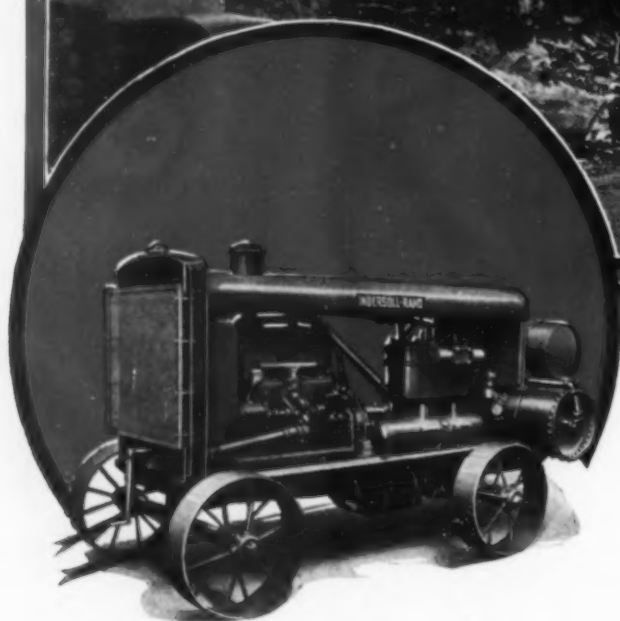
Starting at the level of the old roadbed, the contractors drove a tunnel 55 feet into a wall of solid gneiss. At the end of the tunnel, a lateral was driven to each side. In these laterals, pockets were dug for the blast charge. So well had the work been planned that not even a window pane in the nearby houses was shattered by the blast.

All the drilling was done with the S-49 type of "Jackhammer" illustrated below. An I-R portable compressor supplied the air.

INGERSOLL-RAND CO.

11 Broadway • • • New York City

Ingersoll-Rand



R-2013



S-49 "Jackhammer" drill
Left: Ingersoll-Rand Type 20
Portable Compressor

The Editor Notes - -



Conditions Favorable for Residential Construction

LAGGING behind other types of construction during recent months residential building now faces conditions which the National Building Survey Conference believes are favorable, from the point of view of the home-owner, for a resumption of activity in this field. Of particular interest to the contractor is the assertion that banks and loan associations, executing an about-face, are now actively seeking outlets for their funds in prudent home-building projects. The present attitude of the lending agencies is in decided contrast to their position since the slump in the stock market.

Right now, therefore, the constructor has an opportunity to sell more than his own services. There is at hand ample evidence to support him in the contention that money conditions and material prices at present are as favorable to the prospective home-builder as they are likely to be for some time to come. If the seasonal resumption of residential building, wherever prudent, can be advanced by a few weeks it will contribute materially not only to the improvement of local conditions but also to general business stabilization.

More for the Building Dollar

Along lines similar to those in the foregoing note discussion at a recent committee meeting of the New York Building Congress brought out general agreement on the proposition that buyers of new buildings this year have been enjoying bargain days in so far as construction service is concerned. With employment in the building trades at a low ebb throughout the winter and with many contractors seeking work to maintain their organizations, owners have been able to place contracts for construction at prices substantially below normal. Another favorable factor

CONSTRUCTION METHODS

A monthly review of modern construction practice and equipment

ROBERT K. TOMLIN, Editor

Editorial Staff

VINCENT B. SMITH NELLIE FITZGERALD
J. I. BALLARD (San Francisco)

WILLARD CHEVALIER, Publishing Director

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Tenth Avenue at 36th Street, New York

this year has been an increased output per worker; when men on the job realize that others are lined up waiting to take their places the minute a vacancy occurs there is little tendency to loaf.

A third factor relates to improvement in quality of work. Slackening in construction during the winter forces a certain number of skilled men—foremen, mechanics and others—into the ranks of common labor. From men of this sort, normally employed in a supervisory capacity, it is natural to expect a higher grade of work than from ordinary labor. All of these conditions have combined, therefore, to give the owner more for his building dollar than he usually receives.

Announcing a Series on Railroad Construction

This month's issue contains the first of a series of articles on "Railroad Construction in Mountain Country," by Vincent B. Smith, assistant editor of *Construction Methods*. The series will illustrate and describe in detail the methods employed today by a number of contractors in tunnel driving and grading for several important branch lines penetrating the central portion of the Appalachian Range. Photographs and data will be published in sufficient amount to afford a ready comprehension of the adaptability and advantages of the various practices in blasting, excavating, hauling, and tunnel construction. The articles, furthermore, will give an insight into the organizing and equipping of jobs for large- and small-scale grading and tunneling operations.

Increased Federal Aid

ADDITIONAL stability and continuity have been built into the nation's road program by the \$50,000,000 annual increase (for three years) in federal-aid highway funds, provided for in the measure passed by Congress and approved by the President April 4. Specifically, the new act authorizes federal aid to the extent of \$125,000,000, instead of the former \$75,000,000, for each of the fiscal years 1931-33, inclusive. As in the past, the federal funds, matched by equal amounts from the states, must be spent upon a designated system of primary routes constituting 7 per cent of the total highway mileage. In those states that have completed the surfacing of their 7-per cent systems, six in all, the allowable amount of federal aid that may be expended per mile of road is increased to \$25,000, as compared with \$15,000 under former regulations.

Coming at a time when the nation is looking to the construction industry to help relieve present conditions of unemployment the increased participation of the federal government in the cost of trunk line routes will have a generally stimulating effect. While the larger federal allotment is a comparatively small percentage of the total annual expenditures for highway improvement the new act has other influences of far-reaching importance. Primarily it gives continued assurance of proper selection and coordination of routes, sound design and construction and adequate engineering supervision in all states availing themselves of federal aid.

Higher Steel Stresses

New York City's revised building code, effective March 25, permits an 18,000-lb. unit working stress for steel frame structures instead of the former 16,000-lb. unit stress. The amended code also sanctions the use of alloy steels.

To Save Real Money

TODAY we hear much about the need for intelligent selling. Seldom, however, do we hear very much about intelligent buying. Yet from the nature of things, sound selling and sound buying must move hand in hand if progress is to be made.

Mr. E. F. Watkins is the purchasing agent for the Southern California Edison Company. Speaking before the Purchasing Agents Association of Los Angeles, he offered the following comment on this subject:

"The practice of price jobbing, playing one bidder against another, and all the attendant evils of special, illegitimate discounts, rebates, rejected merchandise, damage claims, and so forth, is widespread and will be difficult to eradicate, especially in the smaller organizations, because of the calibre of the men involved who look upon any saving made in this way as a direct contribution to their own profit.

"The straight-thinking buyer can effect great savings through knowing what to buy and when to buy, by simplifying and standardizing his purchases, and thus be a material aid to his entire organization. But one of these 'smart boys' who is misled into spending all his thought and energy in scheming to beat down legitimate prices to a basis where the seller is deprived of all profit is fooling himself and his company as to the savings he effects, and frequently gets everybody into trouble. The worst feature of this, from an economic standpoint, is that he is neglecting the opportunity which nearly always exists to a greater or lesser degree to save real money along constructive lines."

Construction Methods tries through its editorial and advertising pages to keep the "straight-thinking buyer" posted on what is available to do his job most efficiently. And in doing this consistently we hope to increase the opportunities "to save real money along constructive lines."

Willard Chevalier

Publishing Director

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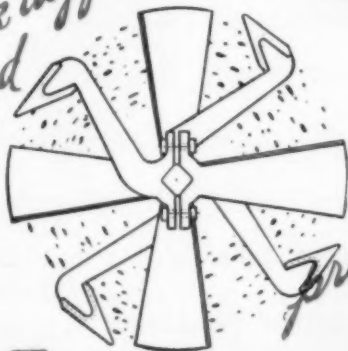
When you plan for Airport Grading—



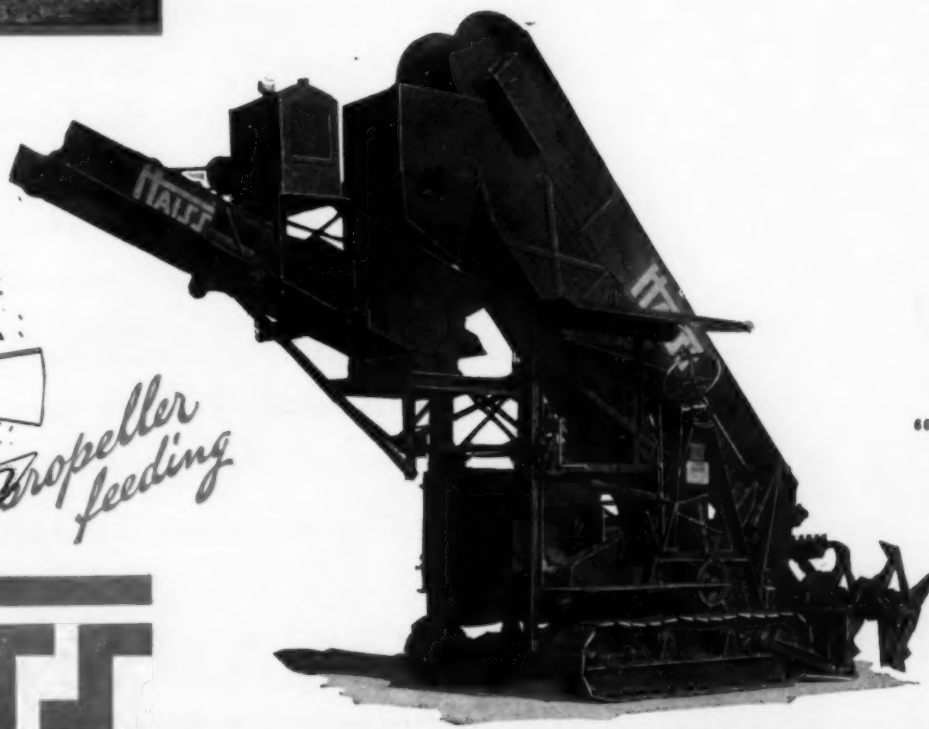
Do as they did at the Curtiss Airport at Glenview, Ill., and skimming cuts and shallow excavation will cost you less. There the contractor used a Haiss Excavator for all the heavy grading, digging runways, hangar foundations, etc. They were even able to dig right through the burned debris and old foundations of a couple of farmhouses. In clay, sometimes hard and dry but often waterlogged, the machine averaged 500 yards per 9 hour day, loading dump wagons. *If you use trucks you'll work the machine faster—see Bulletin 629.*

GEORGE HAISS MANUFACTURING CO., INC.
139th St. & Canal Place, New York
Representatives in Principal Cities

*Pick digging
and*



*propeller
feeding*



663

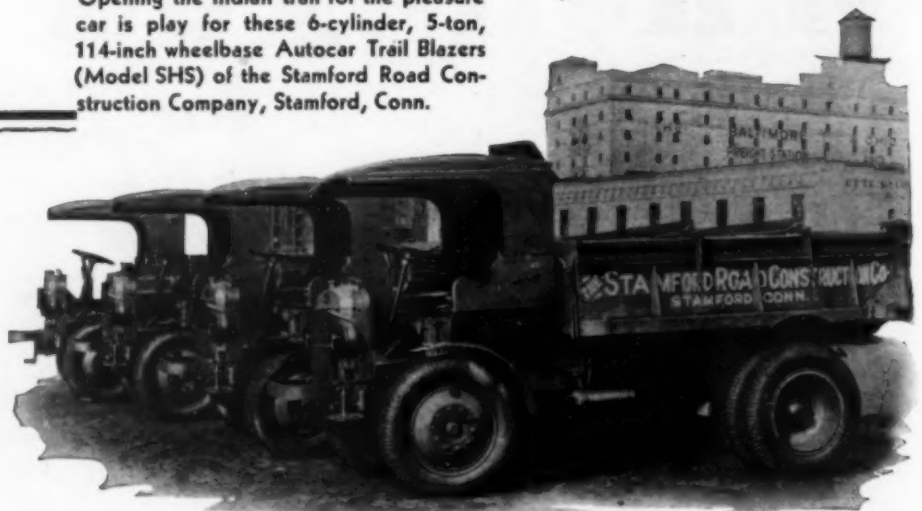
HAISS

EXCAVATOR

IT DIGS

Opening the Indian trail for the pleasure car is play for these 6-cylinder, 5-ton, 114-inch wheelbase Autocar Trail Blazers (Model SHS) of the Stamford Road Construction Company, Stamford, Conn.

WHERE THE GOING IS ROUGH



Where the going is rough use Trail Blazers. You can't beat them for performance in close quarters. Transforming cow-paths, Indian trails and narrow country roads into wide modern concrete highways is "duck soup" for the Trail Blazer group of the precision-built Autocar trucks.

Changing country roads along beautiful Lake Ticonderoga into modern highways is exactly what the Stamford Road Construction Company of Stamford, Conn., has been doing with its Autocar Trail Blazer fleet. Turning on the brim of a hat, they have proved so well adapted for their work that they have won a strong preference with this user.

Autocars are made in conventional as well as engine-under-the-seat models. You may choose from 49 chassis designs according to the nature of the job you have to do.

Write for the Autocar Construction Booklet



AUTOCAR TRUCKS

The AUTOCAR Company, Ardmore, Pa., Established 1897

Any operator *can understand the* NORTHWEST OIL ENGINE

Q No intricate or delicately adjusted metering devices!

Q No high pressures or high pressure pumps to cause trouble!

Q No injectors to clog with the resulting loss of power!

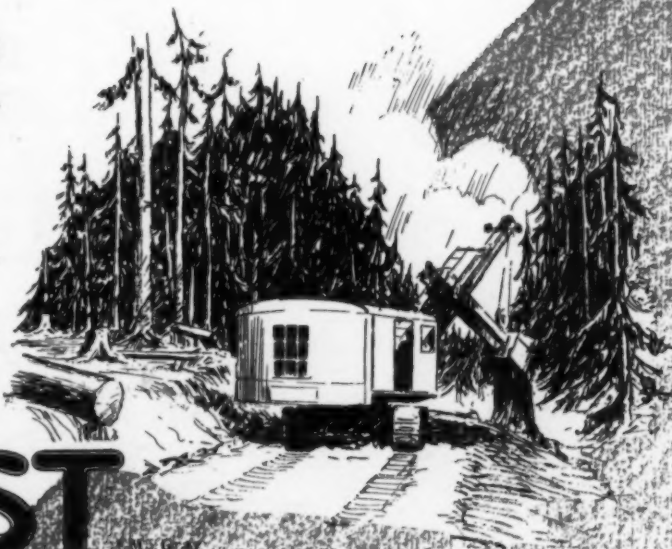
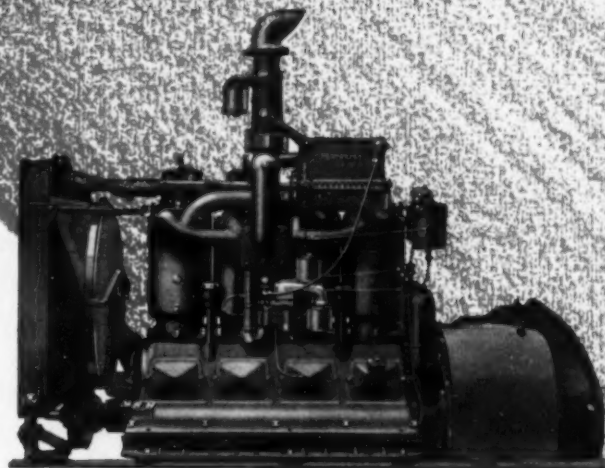
Q No difficulties because of crank-case dilution!

Q No difficulties in securing clean fuel!—*and gasoline engine dependability at all times!*

NORTHWEST ENGINEERING CO.

The world's largest exclusive builders of gasoline, oil burning and electric powered shovels, cranes and draglines

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Chicago, Illinois, U. S. A.



NORTHWEST

Roebling

"Blue Center" Steel Wire Rope

WHEN maintenance cost is lowered and capacity is increased at the same time, every executive and operating engineer is interested in the product which produces these results.

Replacements are annoying and expensive, the long life of "Blue Center" Steel Wire Rope reduces the number of replacements and thus lowers the operating cost. It is particularly adapted to heavy-duty construction work where the ropes are subjected to severe strains; sudden jerks; and excessive loads.

Our Engineering Department will be glad to give special consideration to your wire rope problems.

John A. Roebling's Sons Company - Trenton, New Jersey

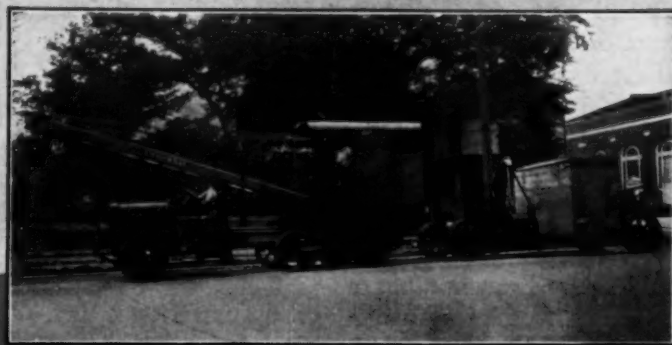
UNIVERSAL TRUCK CRANE

**How Can You Get Along
Without This Versatile Machine?**

A $\frac{1}{2}$ yard digging and material handling unit. Travels at motor truck speed on the highway. Eight fully rubber-tired wheels reduce wheel loads—strictly in keeping with modern lowered wheel load requirements.

Off the highway it travels on its own steel pavement. The Motor Truck (Christie) Crawler is put on or off as easily as a set of tire chains. And it takes the machine through mud, over uneven ground—anywhere there's a crane job to be done. (Exclusively applied to Universal Truck Cranes)

THE UNIVERSAL CRANE COMPANY
LORAIN, OHIO



UNIVERSAL

Doing a double job
 . . . 20 miles
 long



TWENTY miles of up-hill and down-dale digging was only a part of the service rendered by the two Link-Belt type K-55 trench shovels on this Albany, N. Y., water main. Each was equipped with a 2½ yd. bucket.

The pipe used was 48 inch heavy, cast iron—probably the world's longest pipe job using this heavy type of cast pipe.

Section by section the Link-Belt Trench Hoes dug the trench then swung the 7-ton pipe into place. Twenty-seven sections per day of trench (7 feet wide at bottom), and pipe laid, was not unusual, in spite of 15 to 20% grades and often wet digging.

This was another job handled by Pepper Bros., the popular contractors of Syracuse and Albany, New York, now using five Link-Belts. Out of

long experience, Mr. Vic Pepper wrote: "Link-Belts may be more expensive than some of the others, but by far they are the cheapest to operate."

The Link-Belt through-and-through quality in Shovel-Crane-Dragline units will lower *your* yardage and handling costs. Gasoline, Diesel, or electric power.

Shovels—Cranes—Draglines of ¾ to 2 yd. capacity, heavy duty units

LINK-BELT COMPANY

Builders of Locomotive Cranes for 30 years. Portable Loaders—Crawler Cranes—Shovels—Draglines

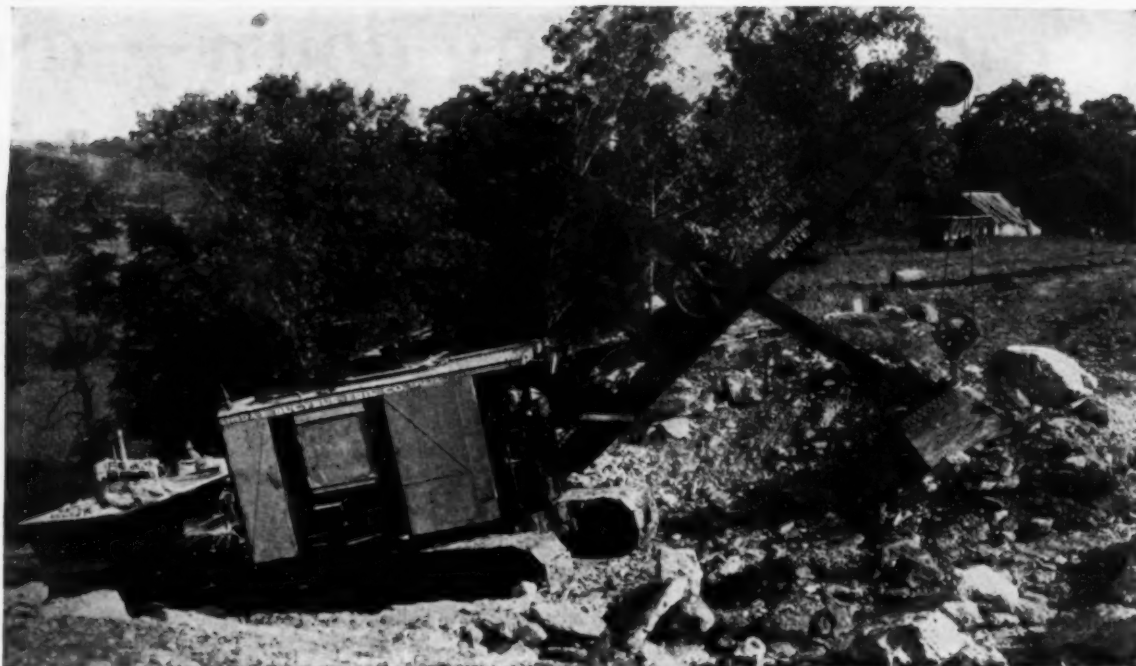
CHICAGO, 300 West Pershing Road

Offices in Principal Cities

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LINK-BELT

SHOVELS + CRANES + DRAGLINES



ONLY ONE OPERATING CLUTCH ON THIS GAS SHOVEL

Five years ago Bucyrus-Erie announced the world's first Gas + Air shovel—widely acclaimed because it combined the convenience of gasoline power with the flexibility, ease of control, simplicity, and speed of the modern steam shovel.

Gas + Airs have proved their dependability beyond a doubt—proved that no other gasoline machine can equal their output . . . Three separate engines—a gas engine for the hoist, and two air-engines, one for the crowd and one for the swing, give this gasoline machine the flexibility and accurate control of a steam machine.

Full 100% power of the gas engine is available when needed for hoisting through hard materials. The

direct-connected crowd and swing air-engines give speed and smoothness unheard of with clutch-type machines.

And now an equally successful development—Diesel + Airs. These two amazing machines are revolutionizing excavating costs. Only Bucyrus-Erie builds Gas + Airs and Diesel + Airs. Write for bulletin.

Representatives throughout the U. S. A. Offices or distributors in all principal countries. Branch Offices: Boston, New York, Philadelphia, Atlanta, Birmingham, Pittsburgh, Buffalo, Detroit, Chicago, St. Louis, Dallas, San Francisco.

BUCYRUS-ERIE COMPANY, manufacturers of the only complete line—all sizes, types and powers. *Plants:* South Milwaukee, Wis., Erie, Pa., Evansville, Ind. *General Offices:* South Milwaukee, Wisconsin.



A-80-5-30-CM

Punching piling down—and pulling them with a real extractor

Years of experience in pile hammer designing and building are back of Warrington-Vulcan Pile Hammers, and their superior service to the contractor has made them a standard of the industry.

Warrington-Vulcan Pile Hammers are "the hammers with the true *punching* action." Incorporating the exactly correct driving principles, they sink piling faster, without damage to pile heads. Upkeep of the hammer is also lower.

Freedom from operating troubles; low operating

cost; an exceedingly simple and positively actuated valve gear; short steam passage to save steam—these are other hall-marks of Warrington-Vulcan Pile Hammer efficiency.

The Vulcan Pile Extractor is America's only exclusive *Extractor*. It is always ready for immediate service. Requires no "harness" nor laborious adjustments. Low in first cost and upkeep. Made in three sizes for pulling the heaviest and most difficult wood and steel piling.

VULCAN IRON WORKS

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Woodward, Wight & Co., Ltd.,
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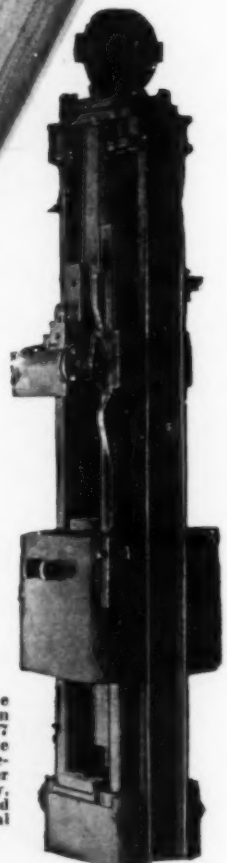
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WARRINGTON- VULCAN Pile Hammers



Vulcan
Pile
Extractor

The Extractor simply needs to be picked up on a crane hook, attached to pile and started. It pounds piling OUT with 550 blows per minute. No rigging up is necessary. A universal joint permits pile to be laid down while Extractor is vertical.



Warrington - Vulcan Pile Hammers have been in successful use since 1887 on important jobs the country over. Users frequently claim it has never been equalled for economy, speed of operation, and freedom from mechanical troubles.

WHY AN OWEN LASTS LONGER . . .

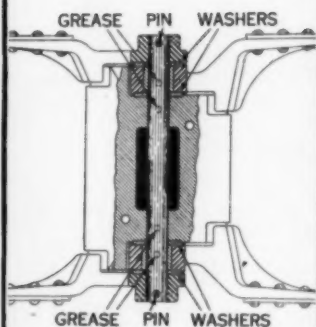
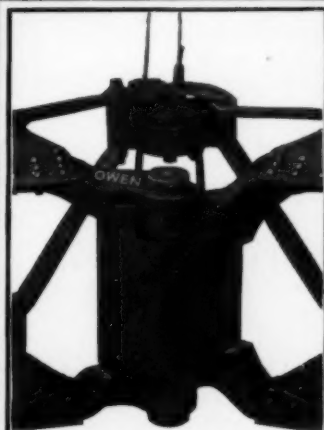
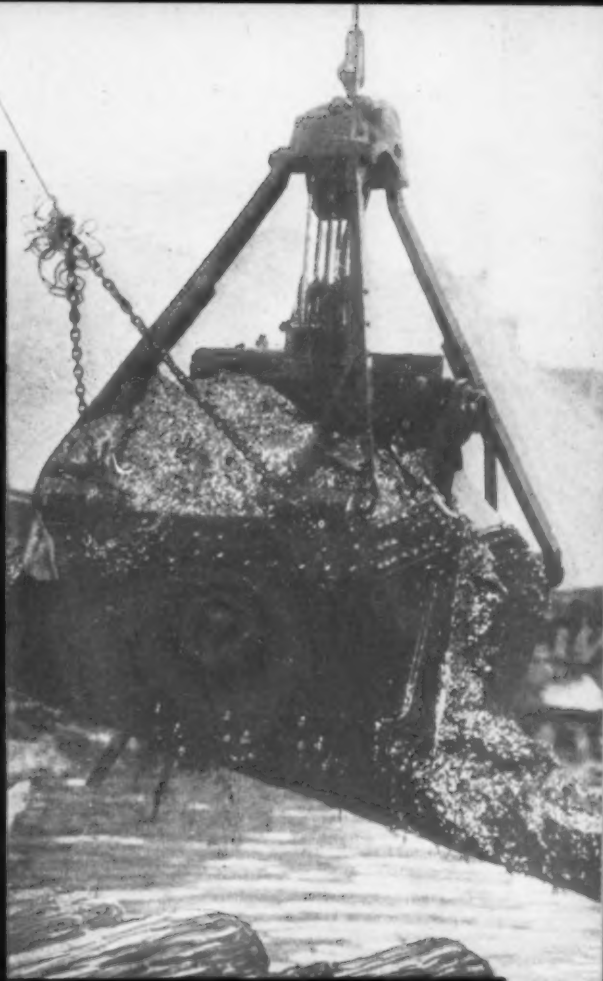
THE OWEN method of keeping the grease in and the grit out of the center shaft bearings means steady, economical operation, longer life for the bucket and low upkeep costs.

The Owen main shaft construction eliminates all wear from castings and provides gritproof lubricated bearings. The outside pair of hinges are pinned to the shaft; the inside pair are bushed. The faces of the hinges are protected by heavy renewable washers fitted between the counterbored faces of the castings. These washers seal the bearings from grit and are completely lubricated by Alemite, which forces grease out from the center of the bearings.

There are 16 more good reasons why Owen Buckets do a better and bigger job in less time and have greater durability. Send for an Owen folder giving details.

THE OWEN BUCKET COMPANY

6023 Breakwater Avenue Cleveland, Ohio

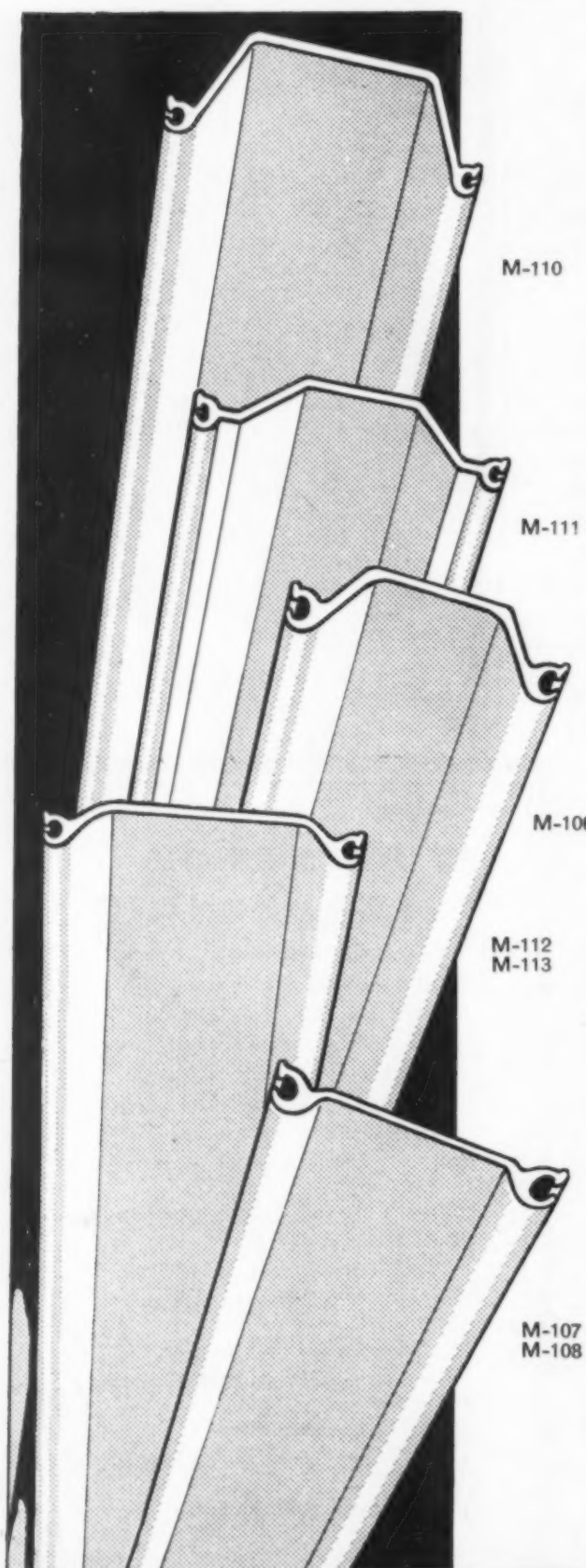


17 POINTS OF LEADERSHIP

1. One-piece steel cross-head.
2. No wear in upper or lower arm ends.
3. Heavy high carbon steel arms.
4. Adjustable undiminished closing power.
5. Long life to sheaves and cable.
6. Long arm bolt bearings sealed from grit.
7. Lever type steel arm brackets.
8. Closing cable is protected against excessive wear.
9. Heavy shock-resisting renewable lips.
10. Cable clips eliminated.
11. Sealed center shaft bearings.
12. Greater digging power with no dead weight.
13. Penetration and clean dumping.
14. Dropping shocks absorbed, eliminating breakage.
15. Rigid shell construction.
16. Heavy duty high carbon drop-forged steel teeth.
17. Lips or teeth points hit first.



Owen Buckets



CARNEGIE

Steel Sheet Piling



WITH the recent introduction of several new sections, Carnegie Steel Company is now prepared to supply steel sheet piling eminently suitable for any driving condition. All sections are characterized by short stiff interlocks to give strength against pulling apart, yet providing sufficient clearance for ease of driving and flexibility of joints. The circuitous route which water must travel through the interlock affords opportunity for lodgment of solid materials in the interlock, insuring practical watertightness.

Our engineers are at your service and will gladly consult with you on problems involving your steel requirements.

Section	Driving Width	Web Thickness	Weight per Foot	Weight per Square Foot of Wall	Section Modulus per Single Piece	Section Modulus per Foot of Wall
M 106	14 in.	$\frac{3}{8}$ in.	36.9 lb.	31.6 lb.	10.34 in. ³	8.86 in. ³
M 107	15 in.	$\frac{3}{8}$ in.	38.4 lb.	30.7 lb.	4.10 in. ³	3.28 in. ³
M 108	15 in.	$\frac{1}{2}$ in.	42.8 lb.	34.2 lb.	4.10 in. ³	3.28 in. ³
M 110	16 in.	$\frac{5}{16}$ in.	42.6 lb.	32.0 lb.	20.34 in. ³	15.26 in. ³
M 111	16 in.	$\frac{3}{8}$ in.	29.3 lb.	22.0 lb.	7.74 in. ³	5.80 in. ³
M 112	16 in.	$\frac{3}{8}$ in.	30.6 lb.	23.0 lb.	2.50 in. ³	1.88 in. ³
M 113	16 in.	$\frac{1}{2}$ in.	36.2 lb.	27.2 lb.	3.28 in. ³	2.46 in. ³

CARNEGIE STEEL COMPANY

Subsidiary of United States Steel Corporation

PITTSBURGH, PA.

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CARNEGIE

STEEL SHEET PILING



"HERCULES" RED-STRAND REG. U.S. PAT. OFF. WIRE ROPE

Are You Interested in Better Wire Rope Service?

No doubt your answer is "yes," so why not get full particulars on the wire rope that has already made good with so many wire rope users?

"HERCULES" (Red-Strand) Wire Rope is not only of high quality, but it is also made in both the Round Strand and Patent Flattened Strand constructions, so as to meet all working conditions.

If you will tell us how you use wire rope we shall be glad to suggest the right construction for best results. The attached coupon is for your convenience; its use will not obligate you, and it may lead to a big saving.

Made Only by
A. Leschen & Sons Rope Co.
(Established 1857)
5909 Kennerly Avenue
St. Louis

Branches:
New York — Chicago — Denver
San Francisco

A. LESCHEN & SONS ROPE CO.,
5909 Kennerly Ave., St. Louis, Mo.
We would like to have your wire rope recommendation
for the following equipment—

Make and Model.....

Rope used for.....

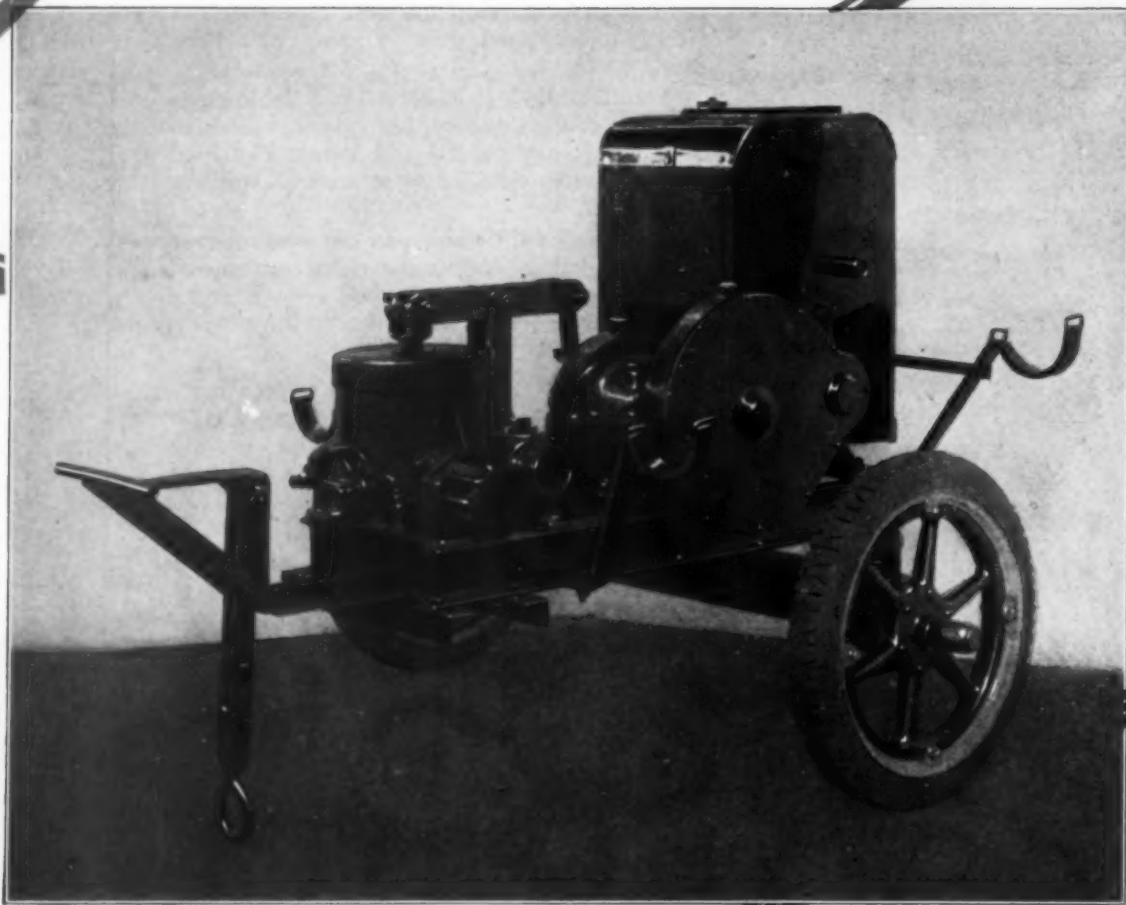
Sizes used.....

Lengths used.....

Name.....

Address.....

New in Principle
New in Design
New in Performance



*Novo Roller Ring Pump mounted on special rubber
tired trailer with combination tongue and prop*

NOVO
ROLLER RING

No Diaphragm No Packing No Oil Seal

There is no other pump anywhere like this new Novo Roller Ring Pump.

It has no packing—no glands—no oil seal—no diaphragm to require attention.

Yet the single, vertical pump has a capacity of 3500 to 5000 gallons per hour—develops a 75' head. Other sizes, available later, will have even greater capacities.

Entirely New

The principle of this Novo is entirely new. Two rubber rings on the plunger roll with the action of the piston. They do not slide.

These rolling rubber rings, pressed against the cylinder wall and piston, make an absolutely liquid-tight seal.

A Rolling Surface Defies Wear

As the Roller Rings roll, they are subjected to no sliding friction. Wear is minimized to a point where it need not be considered.

The Roller Rings are guaranteed for a season's work without replacement.

Straight Line Flow—High Velocity

Due to the short rapid strokes of the plunger—and the straight line flow from

suction to discharge—the water is forced through the pump at a higher and more uniform velocity than in the ordinary diaphragm or plunger diaphragm. This permits the handling of more foreign matter in suspension without damaging the pump.

For the same reason, this pump more nearly approaches a perfect vacuum than other types, making it ideally suited for handling well points.

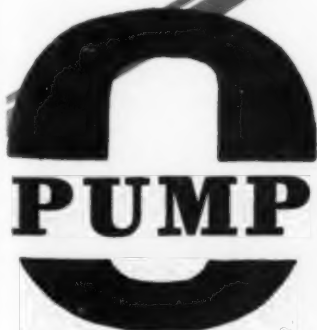
Novo Roller Ring Pumps are self-priming, compact, and light in weight. *They are fitted with steel hinge valves* faced with special composition rubber. Valve seats are set at an angle.

The pumps are applicable to all kinds of de-watering jobs, replacing centrifugal, diaphragm and plunger pumps. On certain jobs, the Roller Rings replace pressure pumps.

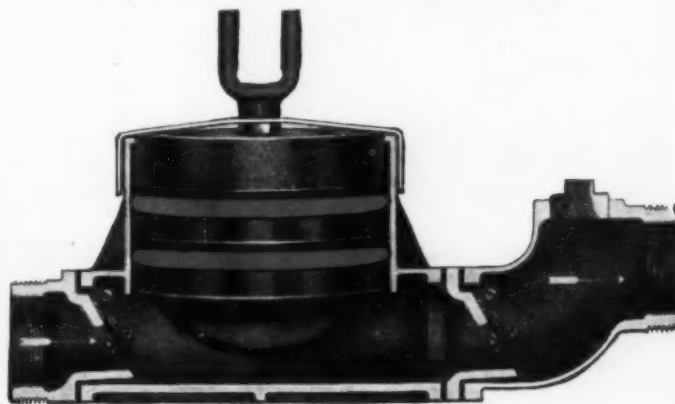
Write for the special folder and complete details on this greatest modern pump development.

NOVO ENGINE CO.

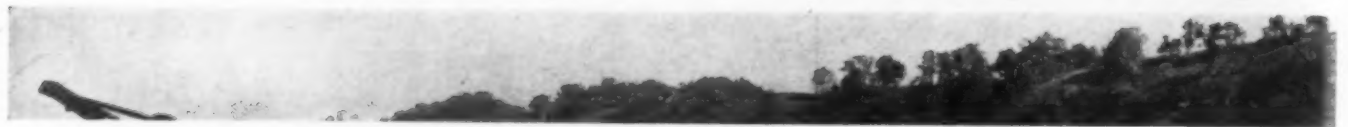
214 Porter St., Lansing, Michigan
Clarence E. Bement, Vice-Pres. and Gen. Mgr.



Note the straight line flow from suction to discharge—and the liquid tight seal produced by the two roller rings on the plunger of the new Novo Roller Ring Pump.



Patent pending



LACKAWANNA STEEL SHEET PILING



used in large cellular Cofferdam for constructing U. S. Government Lock and Dam, Hastings, Minn.



This 775- x 220-foot cofferdam, with a 300- x 200-foot wing at one end, was constructed with Lackawanna 8½-in. x ½-in. Straight-Web Piling. There were 86 circular cells, 12 ft. 4 in. dia., joined by short diaphragms of two to four sheet piles. The piling was 25 feet long on the inner side and 40 feet long on the outer side of the cells. In addition a permanent cut-off wall 4,000 feet long was driven, using 25-foot and 40-foot lengths of piling.

The piling was driven through river silt, hard clay and sand, with occasional submerged timbers.

The maximum depth of water was 20 feet. Although more than 8,000 sheet piles were driven, only one interlock was pulled apart. The piling was assembled in threes at the mill. The job superintendent estimated that the cost of assembling and driving was reduced 20 per cent due to this pre-assembly.

Three 10-inch pumps were used to unwater the cofferdam. When unwatered, one pump, operating at half capacity, was ample to keep the cofferdam dry.

Contractors—

Fegles Construction Company
Minneapolis, Minn.

BETHLEHEM

BETHLEHEM STEEL
COMPANY
General Offices: Bethlehem, Pa.

District Offices: New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Cincinnati, Detroit, Chicago, St. Louis.

Pacific Coast Distributor: Pacific Coast Steel Corporation, San Francisco, Los Angeles, Seattle, Portland, Honolulu.

Export Distributor: Bethlehem Steel Export Corporation, 25 Broadway, New York City.

WHERE TRUCKS CANNOT OPERATE THE **LINN** MAKES MONEY

Sure-footed and with an over abundance of power, the Linn wastes no time between shovel and dump. Watch its patented *flexible* traction grip into the rubber-like gumbo and carry on with the certainty of a wheel truck on a good road.

See the shovel deliver tons of heavy earth or rock into its wide body, and then . . . watch the Linn move away without a protest, over "tough going" to its destination. In a moment it is on its return, backward if the distance is short or the space narrow. Forward or reverse, it travels with equal speed and ease of handling.

Day after day, regardless of the job's demands, weather or ground conditions, the Linn carries on where trucks could not turn a wheel . . . and makes money for its owner. Learn more about Linn performance and profits. Write or wire for data.

**HAULS PAY LOAD
AS IT LAYS ITS
OWN ROAD**

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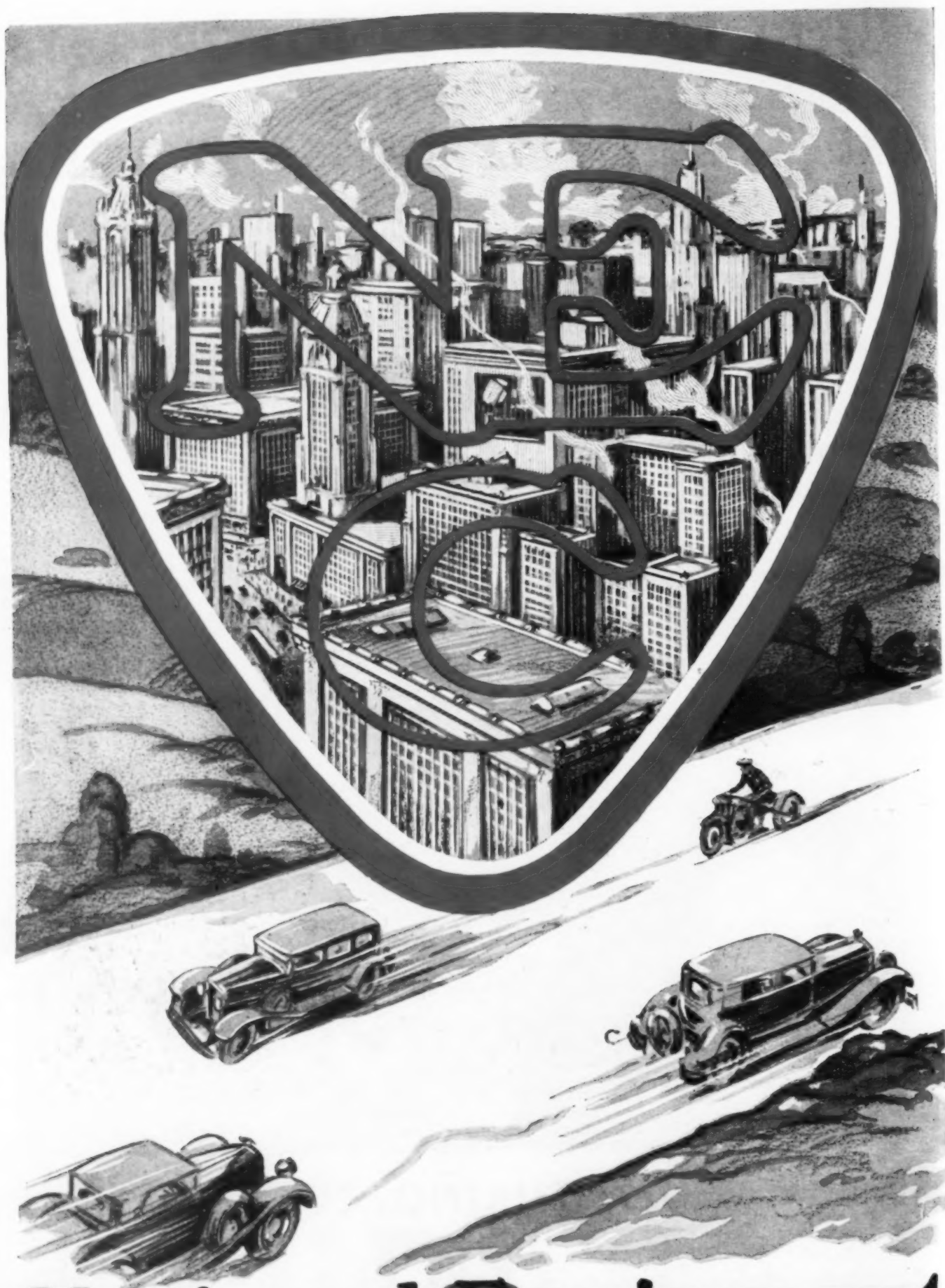
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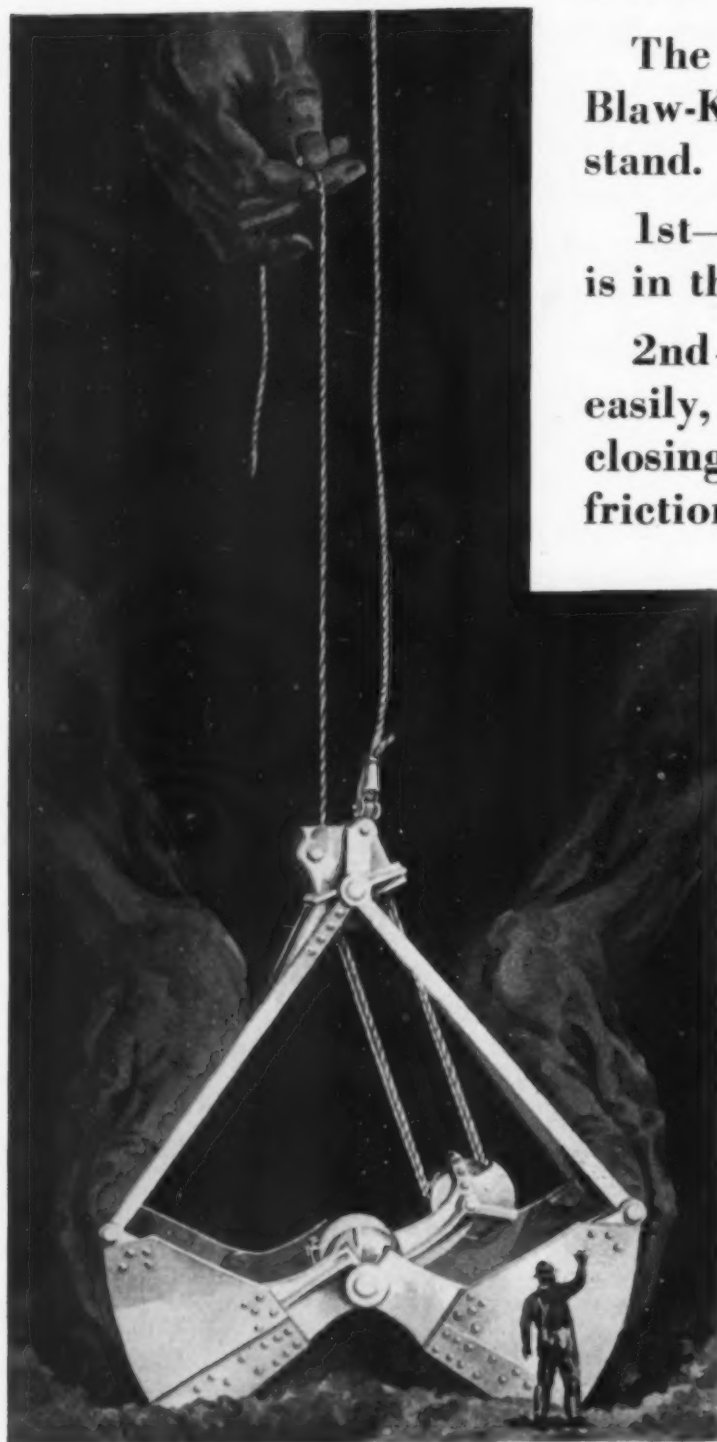
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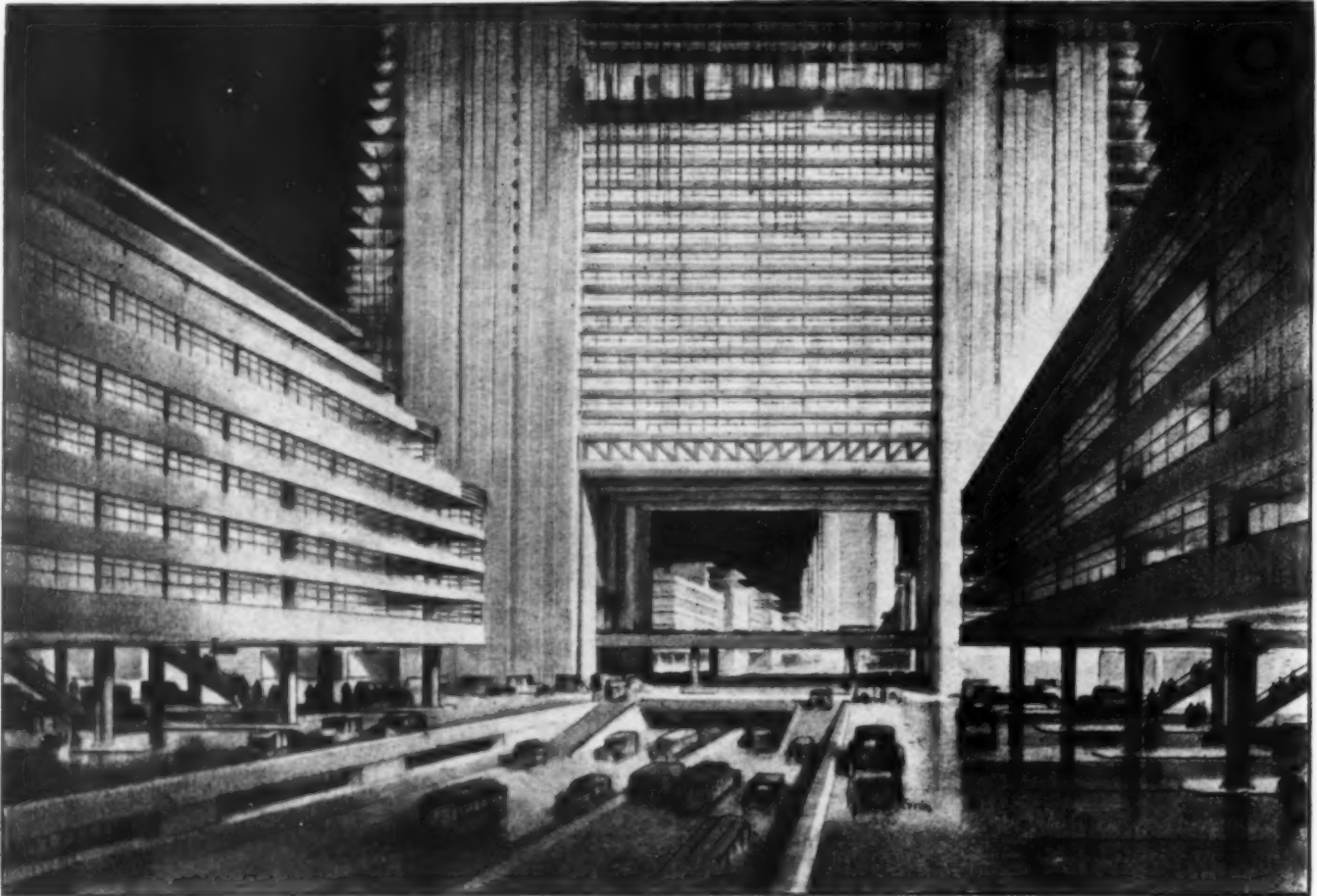
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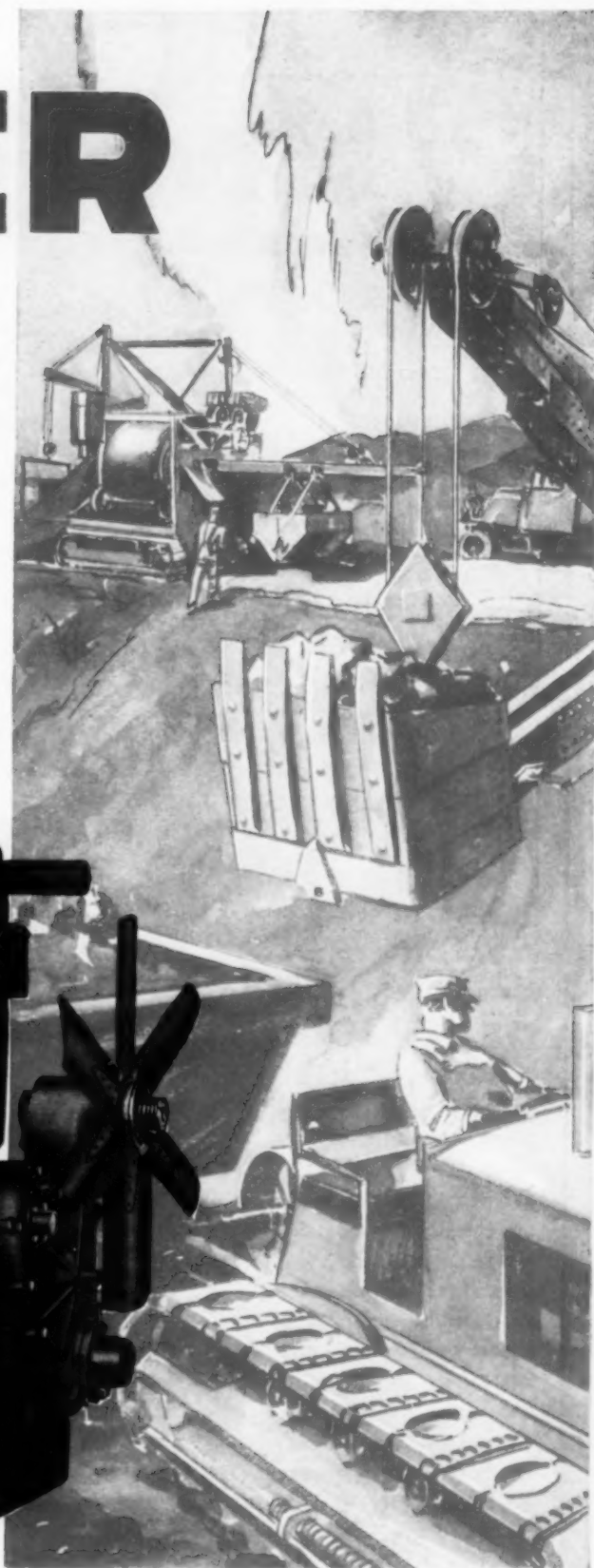
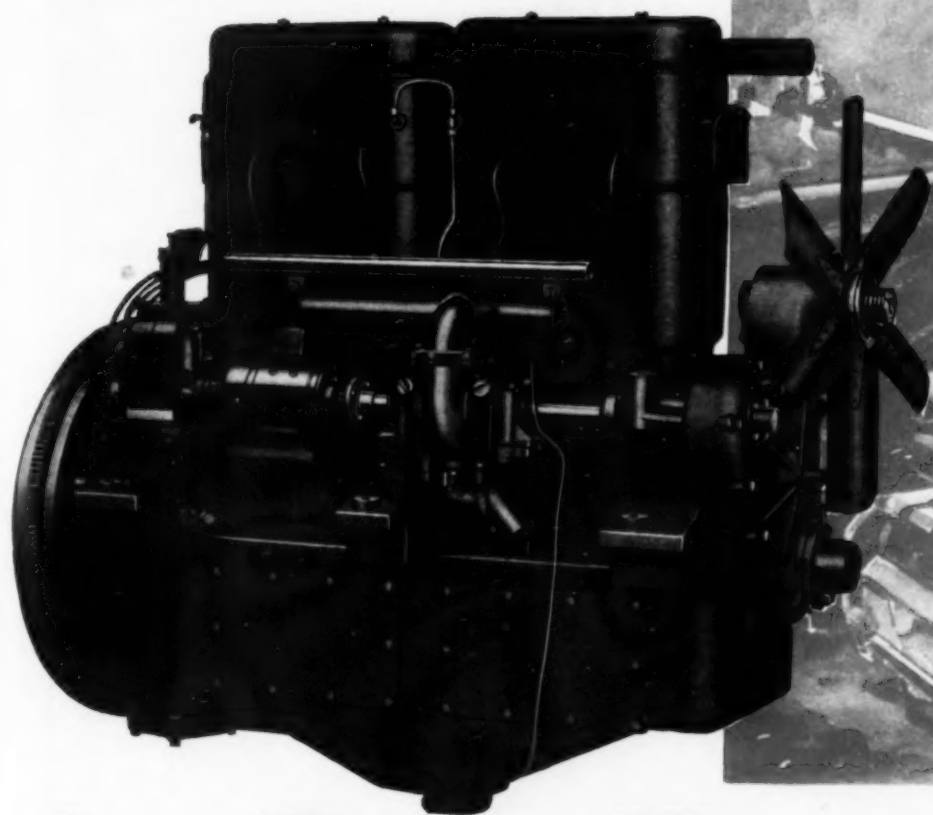
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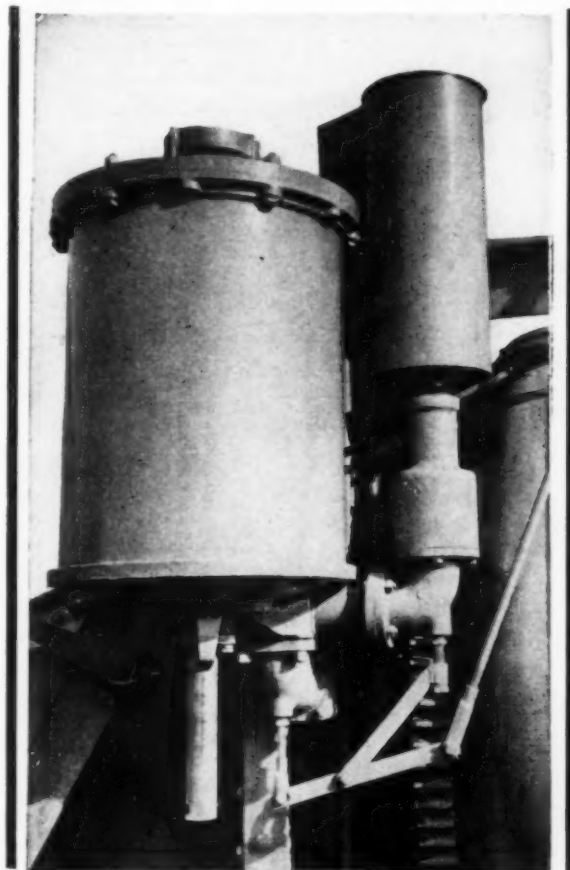
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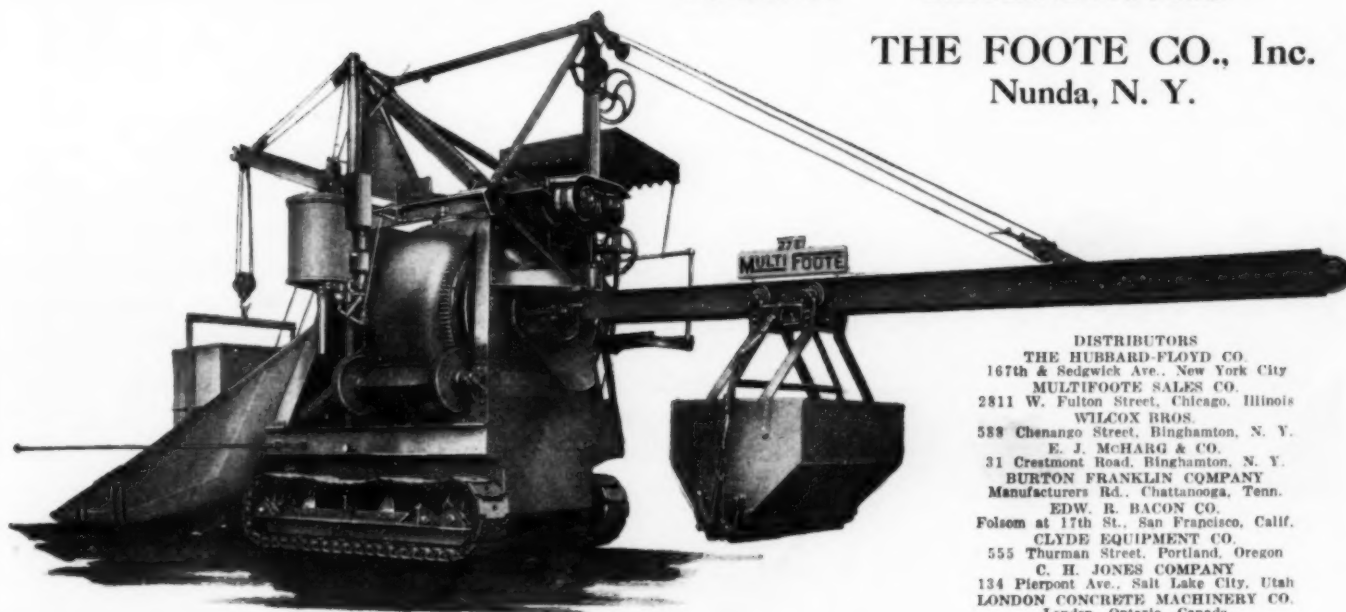
The Measuring Tank, the accuracy of which is not affected by water pressure, condition of grade or air in the supply line, is filled from an open top Auxiliary Supply Tank controlled by a Float valve.

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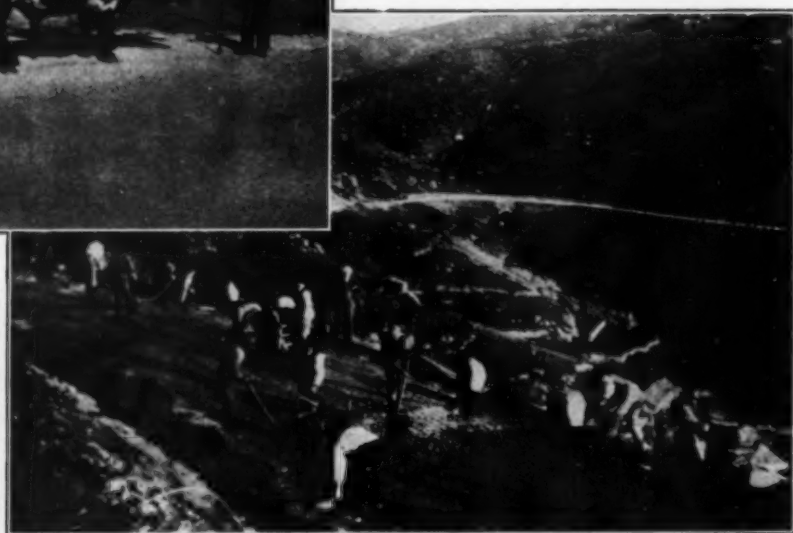
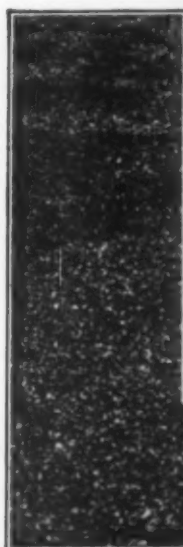
Completed Merida Road,
Seville, Spain



Patching and consolidating prior to Colas
surface treatment, Merida Road



Oxen-drawn roller on Colas surface
treatment, Merida Road, Seville



Near Cape da Roca, Portugal. Colas built, December, 1929

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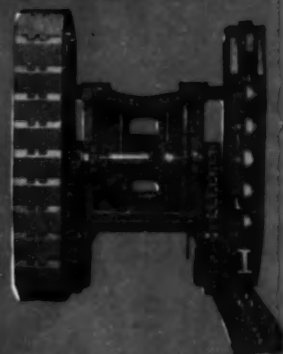
Drive



An OSGOOD Conqueror owned by A. Cope & Sons Ltd., Hamilton, Ontario. The photo shows this OSGOOD digging out stone and concrete footings on an excavating job for the Bank of Montreal, Main Branch, at Hamilton. "Our OSGOOD handles everything it encounters with very little effort," they say, "and handles all excavations to our entire satisfaction."

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BRANCH WAREHOUSES—BOSTON, NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, DETROIT, CHICAGO, ST. LOUIS

A high-early-strength concrete patch, made according to Universal Atlas tested methods, restored this 36-inch water main to use in less than a day.



Back Into Service In Less Than a Day

Patching a 7-inch hole in a water main with high-early-strength concrete enabled the West Virginia Water Service Co., Charleston, W. Va., to put the main back into service in less than a day. The concrete was made according to Universal Atlas tested methods; standard portland cement of the Universal Atlas company (the same as furnished for regular work) was used. A. L. Johnston, engineer; Henry Clay, superintendent, both of the water service company.

The hole was in a 36-inch pipe connecting a settling basin with the filters. It was first caulked with tar and lead wool, then bound with a wide ½-inch steel band. Forms were placed around the pipe to insure a minimum concrete thickness of 18 inches. The concrete was placed at a temperature of 65° F. and was kept at that temperature with a salamander. Proper curing moisture was maintained by sprinkling.

Methods for obtaining high-early-strength concrete with the standard portland cement furnished by the Universal Atlas company will be sent on request. Just use the coupon.

By carefully following Universal Atlas methods you obtain not only high-early-strength but denser, more durable concrete as well.

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Construction Methods

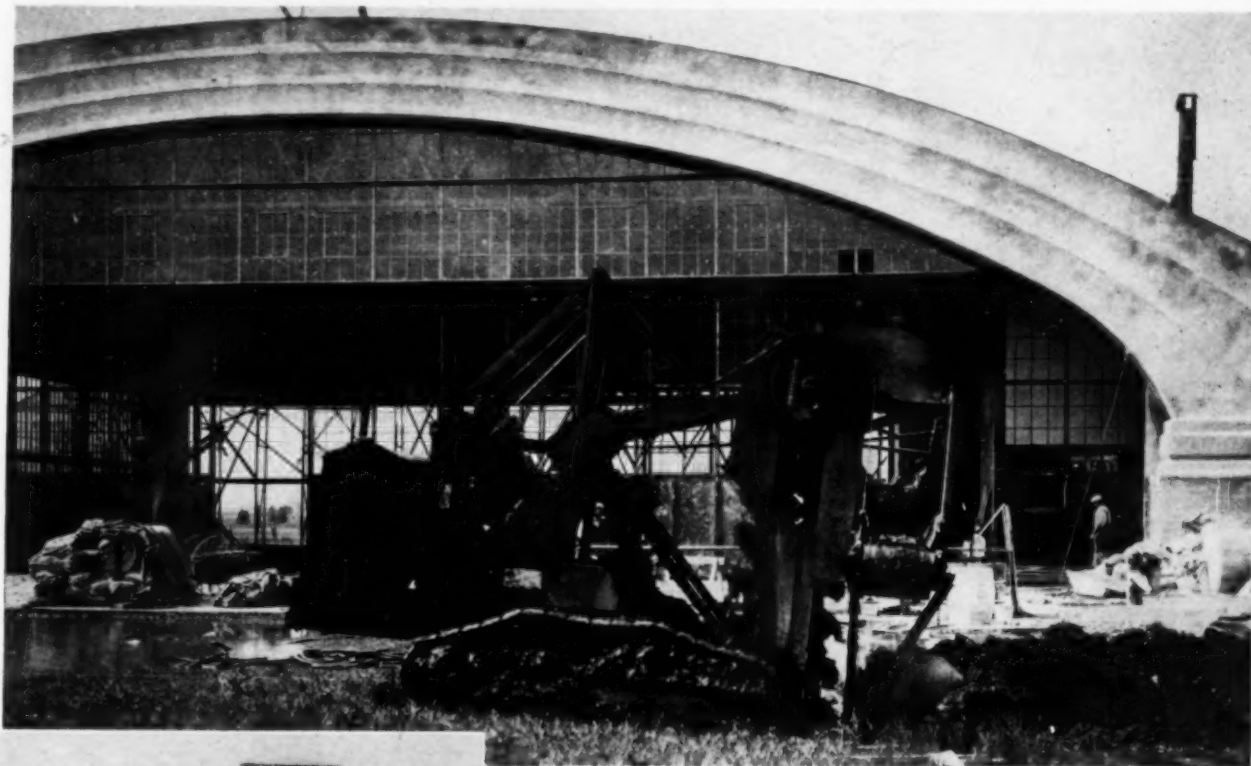
A MCGRAW-HILL PUBLICATION—ESTABLISHED 1919

ROBERT K. TOMLIN, Editor

VOLUME 12

NEW YORK, MAY, 1930

NUMBER 5



VERTICAL BOOM DITCHER (*above*) averages about 3,600 ft. of trench per 12-hr. day at Sky Harbor Airport, Chicago, where 70,000 lin.ft. of tile was laid. At Steinberg Airport (*below*) the average was 3,500 ft. per 8-hr. day.

Vertical Boom Ditcher Digs Trench for

AIRPORT DRAINAGE

THE drainage problem at the recently constructed Steinberg airport in St. Louis was met adequately by laying 30 miles of tile of which 138,000 ft. was of 6-in. size and the remainder of 8-, 10-, 12-, and 15-in. sizes. A Barber-Greene ditcher, owned by H. J. Fauber of Marion, Ill., dug most of the trench for this tile. A machine of the same type handled the trenching for 70,000 lin.ft. of tile at Sky Harbor airport near Chicago.

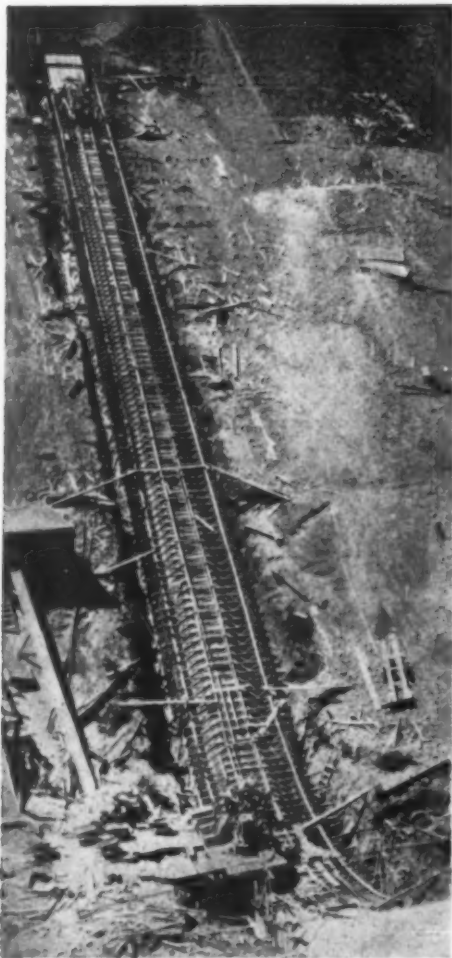
On the Steinberg job two 3-ton vertical digging booms, making 9- and 21-in. cuts were used on the machine. Changes were made in the field from one boom to the

other, without the aid of rigging, by allowing the booms to dig half-way in to the ground and thus support themselves until the necessary bolting and unbolting of push arms was accomplished.

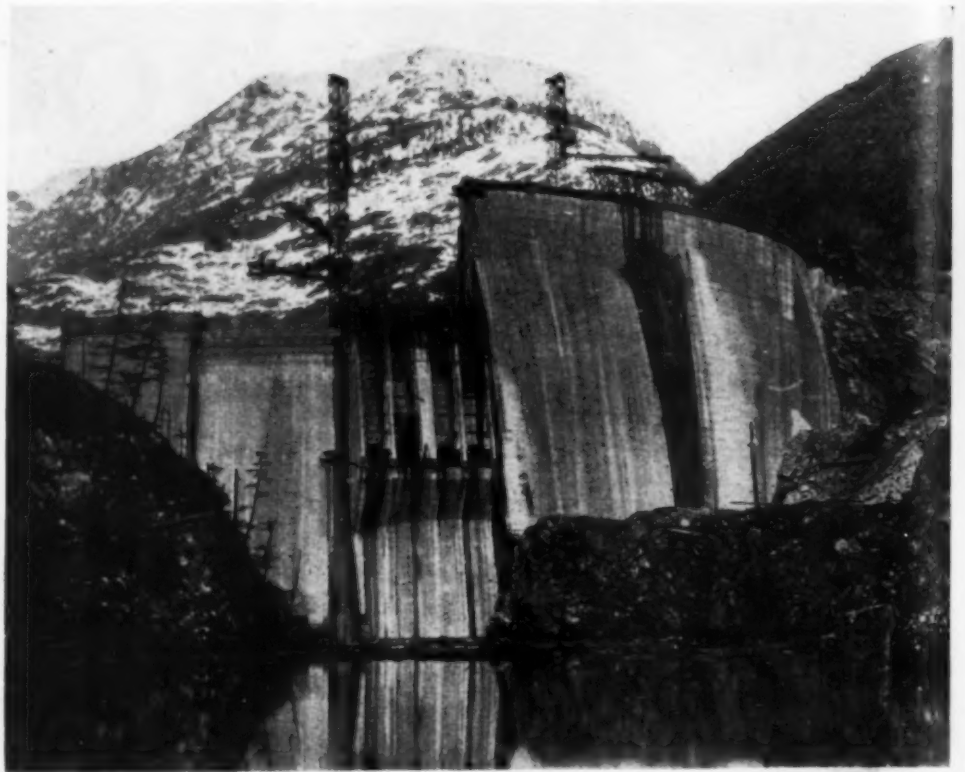
Targets 8 ft. high were set at frequent intervals along the ditch line. By sighting on these targets the operator was able to keep the trench to grade without leaving his seat, the power boom hoist on the machine governing the depth of the trench.

With the narrow boom the machine digs at the rate of 3,500 ft. per 8-hr. day with a maximum in four hours of 2,065 ft. and a maximum in 7 hours of 3,650 ft.

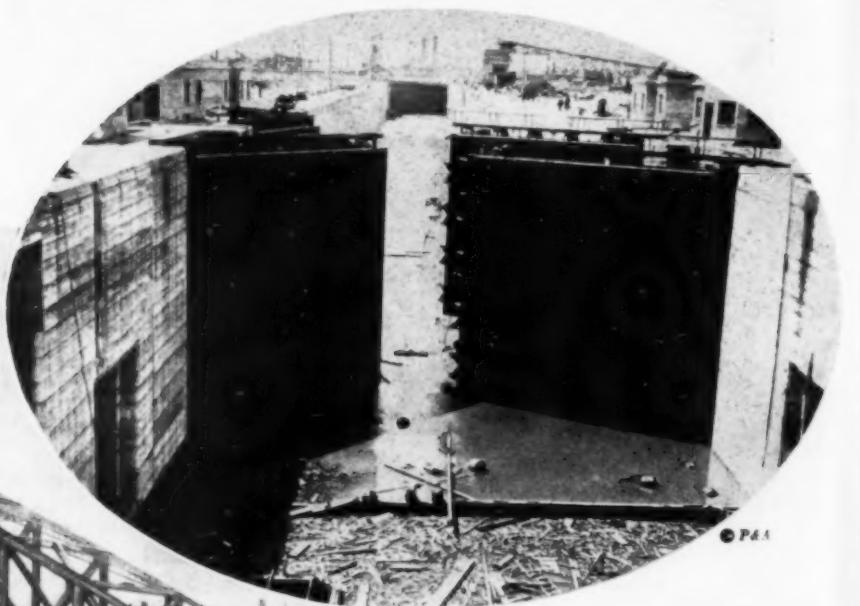
This Month's "News Reel"



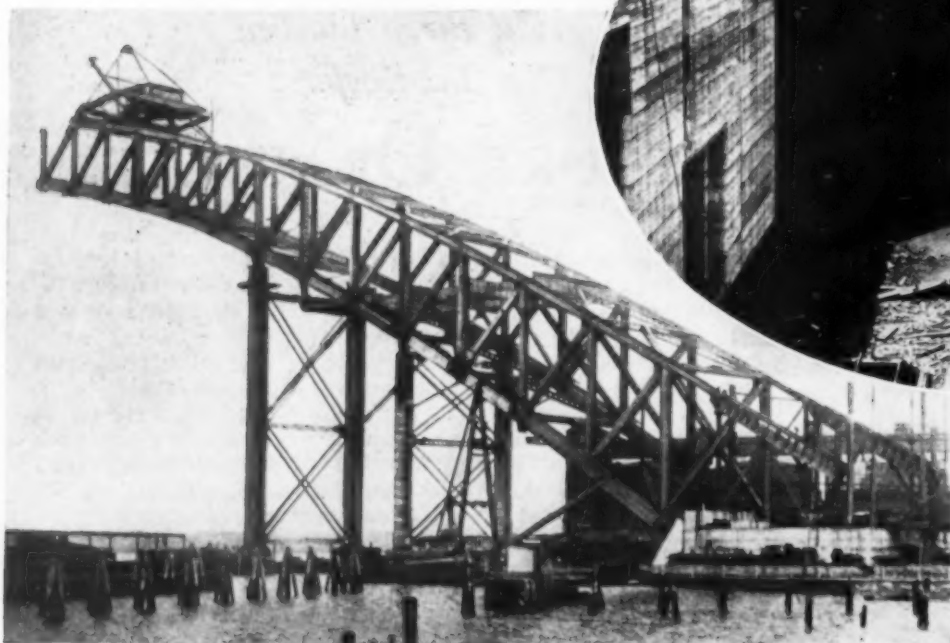
HAYWARD CANYON SIPHON, with outside forms in place, under construction on U. S. Bureau of Reclamation's Yakima project in Washington.



DIABLO DAM on Skagit River, constant-angle concrete arch structure 386 ft. high, is important unit in power development program of Seattle, Wash. Winston Bros. Co., of Minneapolis, used belt conveyors to distribute the concrete in the dam.



HUGE GATES (above) in place at one of the seven locks of Canada's Welland ship canal, connecting Lakes Erie and Ontario by a 25-mile route. The locks are each 820 ft. long and 80 ft. wide, with a lift of 46½ ft. Total lift between waters of two lakes is 325½ ft. Lock gate heights range from 35 to 83 ft. Each gate leaf consists of horizontal steel girders inclosed on both sides by steel sheathing sheets.



STEEL ARCH for new interstate bridge reaches out over the Kill van Kull to connect Port Richmond, Staten Island, N. Y., with Bayonne, N. J. Main arch, 1,675 ft. long, is being erected by the American Bridge Co., using steel falsework towers.



ELEVATED EXPRESS HIGHWAY is under construction by James Stewart & Co., Inc., along Hudson River to carry vehicular traffic between Canal and 72nd Sts., New York. © Keystone



Photo from U. S. Bureau of Public Roads

AFTER SIGNING federal-aid highway bill April 4. President Hoover and members of congressional roads committee increase federal aid from \$75,000,000 to \$125,000,000 per year



ANOTHER CHICAGO SKYSCRAPER, the La Salle-Wacker building, rears its head 40 stories above Wacker Drive.

DEDICATED. (below) Wanaque dam and 20-mile steel pipe aqueduct are officially placed in service to supply 100,000,000 gal. of water daily to ten New Jersey communities.



CONSTRUCTION METHODS—May, 1930



WELL DRILL, perched high on cliff above Gauley River, sinks holes for blasting face of side hill cut.

By VINCENT B. SMITH

*Assistant Editor,
Construction Methods*

CONDITIONS approximating those encountered in pioneer railroad construction of 40 years ago have called forth all the skill and resourcefulness of the engineers and contractors who are building the 28.1-mile line of the Nicholas, Fayette & Greenbrier Railroad in the canyons of the Gauley and Meadow rivers, between the villages of Swiss and Nallen, W. Va. In spite of the remoteness of the project and the difficulty of construction in the steep and narrow canyons, modern methods and machines are enabling the builders to make rapid progress.

The Nicholas, Fayette & Greenbrier Railroad, named for the three counties which it traverses, is a corporation controlled by the Chesapeake and Ohio and the New York Central and authorized by order of the Interstate Commerce Commission to give both the competing railroad companies economical access to virgin coal and timber land. Under the contract between the controlling companies, it is provided



PROJECTED GRADE LINE, approximately 55 ft. above Meadow River, penetrates solid rock bluff, requiring cut 120 ft. high to top of slope.

Beginning a Series Railroad Construction

*Modern Machines and
of 28-Mile Link*

that the Nicholas, Fayette & Greenbrier Railroad will assume ownership of a 40-mile branch, title to which is now in the Chesapeake and Ohio, extending from the main line at Meadow Creek to Nallen, and of several feeders tributary to this branch, all known as the Sewell Valley subdivision and embracing the railroads of the

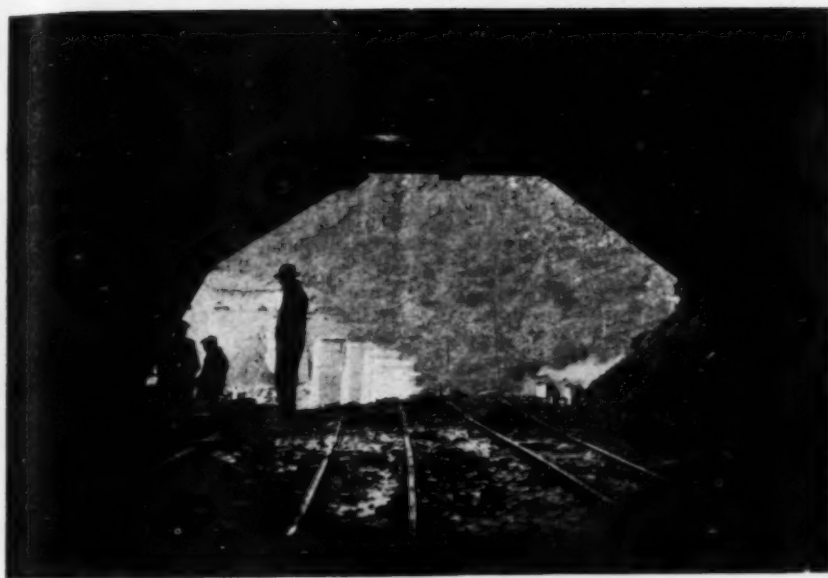
Loop and Lookout, Sewell Valley, and Greenbrier and Eastern companies. The 28.1-mile line under construction really is a connection between the southern terminus of the Ohio Central Lines of the New York Central Railroad at Swiss, 47 miles east of Charleston, W. Va., and the terminus of the existing Sewell Valley subdivision at Nallen.

Grades up to $3\frac{1}{2}$ per cent and four switchbacks on the line made the Sewell Valley subdivision from Meadow Creek to Nallen expensive to operate. The new line gives access to the same territory over maximum grades of 2 per cent, compensated, and maximum curves of $11\frac{1}{2}$ deg. There are no grades against loaded traffic. By building a short connection at Beech Glen, approximately 2 miles below Swiss, the Chesapeake and Ohio gains access to the new line at the north end over the tracks of the New York Central.

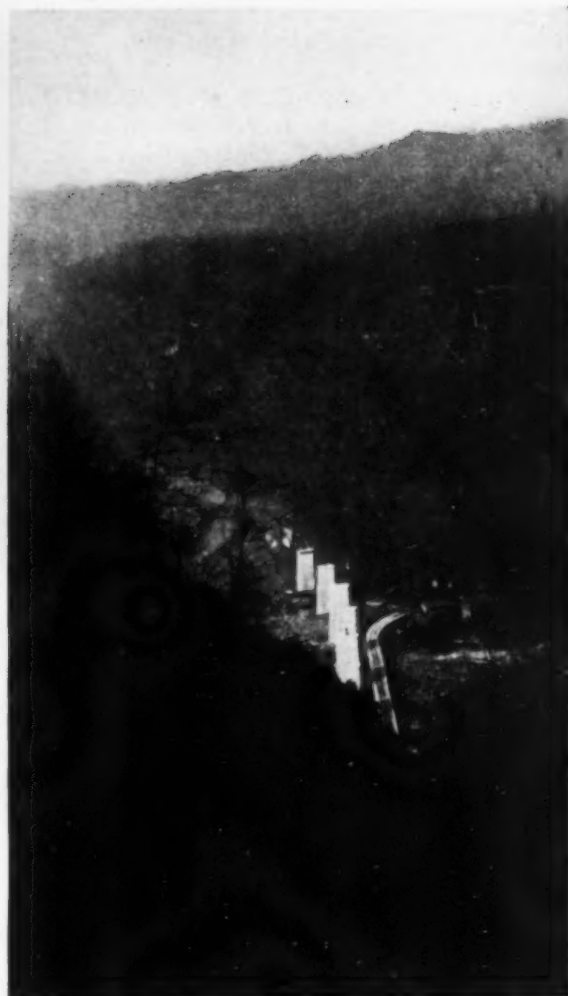
Difficulties of Country—The rugged character of the terrain greatly increases the difficulties of transportation and construction. This portion of the Appalachian Range probably is as rough as any part of the United States. Along many parts of the line, the canyon walls rise from the Gauley and Meadow rivers at angles of 45, 60, and 90 deg. to heights of 400 or



G. N. WRIGHT (left) and J. W. MURPHY, of Brown, Murphy & Wright, sub-contractors for $3\frac{1}{2}$ miles of grading.



NORTH PORTAL of Koontz Bend tunnel looks out on piers of Gauley River bridge. Horses and mules haul heading muck to portal.



RUGGED TOPOGRAPHY increases difficulties of construction. Koontz Bend tunnel pierces mountain in foreground. Compressor plant and mixing plant are on far side of Gauley River.

of Articles on in Mountain Country—I Methods Speed Building in West Virginia

500 ft. A typical canyon wall might be described as a talus slope lying on a 1:1 or steeper slope from the water's edge to a height of perhaps 200 ft., where the slope ends in sheer sandstone cliffs. These talus slopes were covered by an almost impenetrable growth of virgin timber, laurel, and underbrush, through which the engineers of several surveys made by different railroads in the past 25 years with great difficulty projected their preliminary lines.

The steepness of the slopes and the tortuous windings, combined with the rapid fall, of the streams made satisfactory location difficult. A few relocations of the original line have been made by C. M. McVay, engineer of construction, with the aid of the engineers assisting him, to improve the alignment or reduce construction costs. Approximately 60 per cent of the line is on curves, the maximum curves being one of 9 deg. on the Gauley River and three of 11½ deg. on the Meadow River.

Two tunnels and one large bridge are included in the line. Tunnel No. 1, at Koontz Bend, is 3,200 ft. long; tunnel No. 2, at Carnifex Ferry, is 900 ft. in length. The only large bridge, crossing the Gauley River just below the mouth of Peter's Creek, 8½ miles above Swiss, is a 710-ft. plate girder

structure, consisting of eight 80-ft. spans and one 70-ft. span. There are six small deck girder bridges, spans 15 to 44 ft., and ten arch and box culverts, 10- to 20-ft. openings on the line.

Construction Quantities and Progress—Excavation amounts to approximately 1,500,000 yd., more than half of it solid rock. About 15,000 yd. of

concrete are required for the bridges and drainage structures. Because of the inaccessibility of the projects, all coarse and fine aggregates are crushed



IN CHARGE OF CONSTRUCTION. (Left to right) C. M. FAULKNER, superintendent, A. Guthrie & Co., Inc.; J. A. STOCKER, chief engineer, Ohio Central Lines; G. S. PLUMLEY, resident engineer on Residency 1; and C. M. McVAY, engineer of construction.

from hard local sandstone at the sites of the structures.

A. Guthrie & Co., Inc., St. Paul, Minn., was awarded the contract on February 20, 1929. The contract stipulates a completion date of July 1, 1930. Excavation of the tunnel benches, lining of the tunnels with concrete, and track laying were the only major operations still to be performed on Feb. 1. At that time grading was more than 90 per cent complete, and masonry was 98 per cent complete.

Access to Project—The job was accessible at five points, as indicated on the map. From Swiss, an old standard-gage lumber railroad ran up the Gauley to Peter's Creek (the location of the bridge and long tunnel) and thence up Peter's Creek, meeting a state road at Lockwood, 3 miles from the Gauley River. This railroad offered two means of access, one from Swiss and one from Lockwood. However, the track was serviceable only for a short distance out of Swiss, as the rest of the line had been abandoned 11 years before.

Two rough, narrow, unimproved county roads offered the very difficult but only available means of transporting equipment and materials to the sections of the line between the long tunnel and Shawver's Bridge. These two roads are shown on the map as the Saturday Road and the Sunday Road. At the south end of the line,



G. S. PLUMLEY (left), resident engineer, and A. B. CHURCHILL, masonry inspector, on Residency 1, in Mr. Churchill's camp at Peter's Creek.

a narrow-gage railroad extended from Nallen for approximately 6 miles down the Meadow River. This railroad, being located on the proposed right-of-way of the N. F. & G., on the south side of the river, had to be moved to a former location on the north side. A bridge to accommodate this relocation was built across the Meadow River about 1½ miles above Shawver's Bridge.

Engineering Supervision—By agreement between the two owners of the N. F. & G., construction has been placed under the supervision of the New York Central, with J. A. Stocker, chief engineer, Ohio Central Lines, Columbus, Ohio, in charge. Operating under Mr. Stocker at Charleston, W. Va., is Mr. McVay, engineer of con-

struction, assisted by G. L. Link, assistant engineer of construction (of the Chesapeake & Ohio). The line is divided into three residencies. Residency 1, extending 10 miles up the river from Swiss and including the bridge and Koontz Bend tunnel, is supervised by G. S. Plumley, resident engineer. Residency 2, 8 miles in length, takes in some of the heaviest grading on the line. J. E. Hammond, resident engineer, is in charge of this section. Residency 3, 10 miles long, including the 900-ft Carnifex tunnel and the grading work to Nallen, is under the control of W. H. Eary.

Sub-Contractors—A. Guthrie & Co., Inc., sublet most of the work to five contractors, reserving for itself the long tunnel, the bridge, and 2½ miles of heavy grading, below Shawver's Bridge. A. Keathly, Charleston, W. Va., is doing the grading and track laying on the 8 miles from Swiss to Peter's Creek. G. A. Rosenbaum, East Bank, W. Va., has the approach cut at the south portal of the Koontz Bend tunnel and 1 mile of grading work beyond. Piper & East, and Brown, Murphy & Wright, of Princeton, W. Va., assumed a sub-contract to grade the next 7 miles. Dempster Construction Company, Knoxville, Tenn., is doing the work on the next 1½-mile section, including the driving of the 900-ft. tunnel. The 2½-mile grading section of A. Guthrie & Co.,



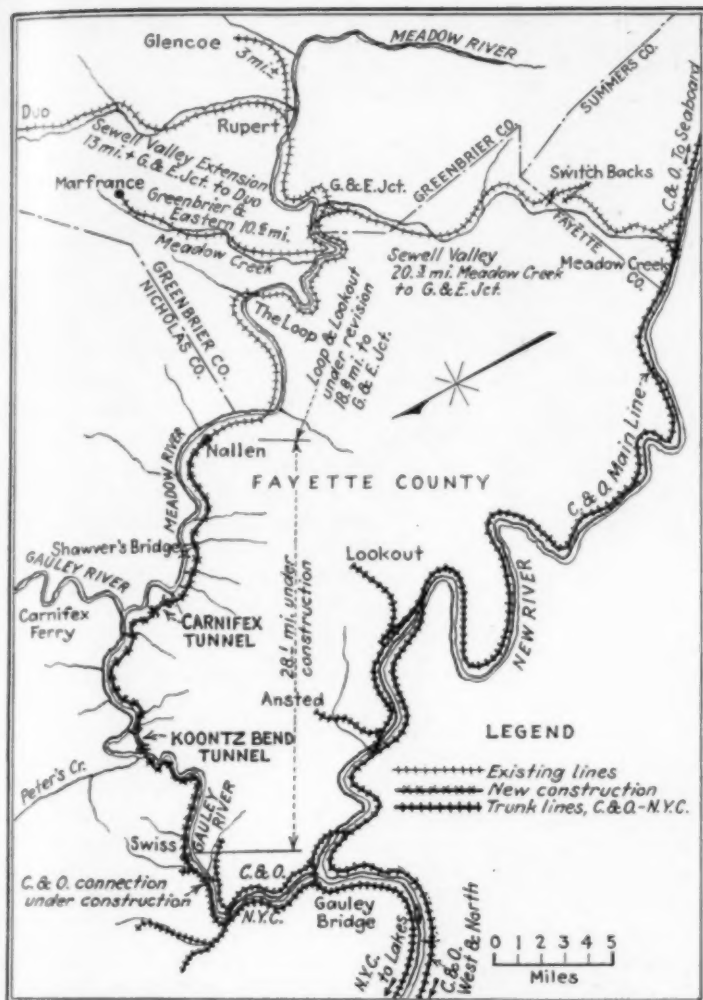
DIESEL SHOVEL crashes through forest to site of arch culvert.



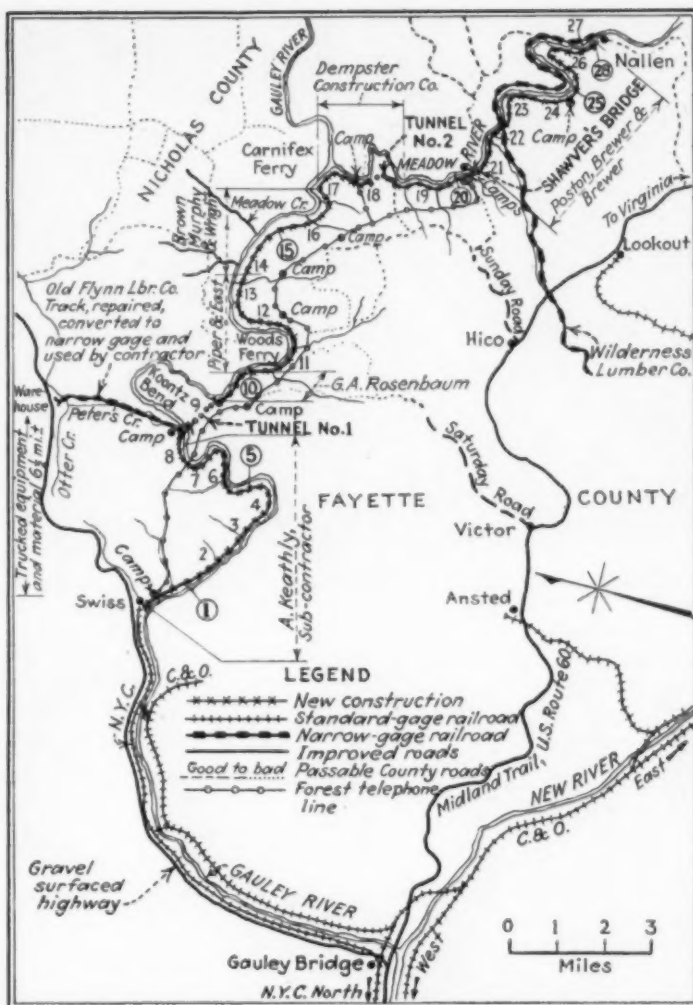
W. L. PIPER, of Piper & East, and J. E. HAMMOND, resident engineer on Residency 2.



STONE CULVERT on Brown, Murphy & Wright's section. Project includes half dozen of these native stone culverts.



LOCATION MAP of Nicholas, Fayette & Greenbrier Railroad. New construction connects southern terminus of New York Central with Nallen terminus of Chesapeake & Ohio's Sewell Valley subdivision.



ACCESS TO NEW CONSTRUCTION is possible at five points: Swiss, Peter's Creek railroad, Saturday Road, Sunday Road, and Nallen. Figures along route indicate mile posts.

Inc., intervenes between the Dempster Construction Company and the 8-mile grading section of Poston, Brewer & Brewer, Chillicothe, Ohio, extending from near Shawver's Bridge to Nallen.

General Construction Plan—The critical factor in the completion of the railroad by scheduled date is the long tunnel. To expedite construction of the tunnel, par-

ticularly of the lining, it is desirable, if not necessary, that the bridge be completed to afford a secure crossing for

concrete trains. No site for a crushing and concrete plant was available on the tunnel side of the river and the plant was placed on the north side to serve both bridge and tunnel. To get in bridge steel from Swiss, track must be laid as far as Peter's Creek.

While concrete lining of the Koontz Bend tunnel is being completed, it is expected that



ALEXANDER HOLMAN (above), superintendent for A. Keathly, makes use of one sure means of transportation in rough country.



D. R. PHILLIPS (left), inspector, and **W. J. LEWIS**, superintendent, are in charge at south portal of Koontz Bend tunnel.



LON HAWK (left), superintendent for Poston, Brewer & Brewer, and **W. H. EARLY**, resident engineer on Residency 3.



MILE 12 PARTLY CLEARED for grading, Piper & East section. Grade line is about 40 ft. above Meadow River.

track can be laid from Nallen through the lined short tunnel to the south portal of the long tunnel. Rail heads can then meet in the long tunnel in time to have the railroad ready to operate July 1. Construction operations have been planned to meet this schedule.

Methods of Construction—The purposes of this article can be well served by considering the methods employed on the different contract sections in order, starting with the zero mile post at Swiss.

A. Keathly Sub-Contract Section—Total excavation on the 8 miles between Swiss and the north end of the bridge amounts to 400,000 yd., of which 50 per cent is hard rock and 20 per cent, loose rock. Practically all excavation is in sidehill cuts on slopes ranging from 1:1 to cliffs. Cuts vary from 20 to 100 ft. deep, measured to top of slope.

About 60 per cent of the material is cast. Trucks hired on contract do most of the hauling. On the first mile, however, where the lumber company track was in good condition, a Bucyrus 70 2½-yd. track-type railroad shovel loaded two 20-yd. Western air-dump cars. A Vulcan standard-gage saddle-tank steam dinkey hauled about 40,000 yd. of spoil in these cars a distance of ½ mile. While the railroad shovel was loading on this section, a Lorain 1½-yd. gasoline shovel went ahead another mile, side casting. From Mile Post 2 to Mile Post 4, this shovel and another Lorain 1½-yd. cast and loaded material. Here the Bucyrus 70 again was brought up with great effort to cast for 1½ miles. The Lorains excavated all the earth and rock on the last 3½ miles. Two ¾-yd. steam Eries follow the 1½-yd. excavators to trim and finish the grade.

Wherever practicable on the Keathly section, a Sanderson Cyclone 6-in.

gasoline well drill was used to put down the holes for blasting. As all the spoil was needed for fills, great care was taken in loading the holes to break the rock without wasting it into the river. Alexander Holman, superintendent for Mr. Keathly, drilled the holes to grade on the ditch line and loaded them with Judson powder, a low-strength, slow-acting high explosive in granular form. The holes ranged up to 60 ft. in depth.

A few experiences in which rock failed to break to grade in blasting showed the necessity of drilling the holes again after springing to be sure they were open to the bottom. When holes were loaded to the bottom, the blasts were very successful, breaking the sandstone, which here is stratified in thick horizontal layers, to grade,

without dislodging the material more than a couple of feet.

In many places it was impossible to perch the well drill on the edge of the cliffs. At these points, portable compressors and jackhammers were employed to break down the face of the rock in steps. One 80-ft. cliff was blasted in this way, the jackhammers drilling 16-ft. holes, and 4-ft. benches being left between lifts to form a ¼:1 slope.

A. Keathly laid the track on his section, using a Bucyrus locomotive crane for this work. The New York Central is supplying 105-lb. rails from its main lines, where this weight is being replaced by the new 127-lb. standard. Track was laid to Peter's Creek early in March, as desired by the general contractor to permit delivery of bridge steel.

Peter's Creek Railroad—To haul equipment and materials to the mouth of Peter's Creek, the contractor rebuilt the railroad from Lockwood, converting the standard-gage to 3-ft. gage and building six trestles up to 310 ft. long across Peter's Creek. For stringers on these trestles and on the construction bridge across the Gauley River at the mouth of Peter's Creek, the contractor used 56-lb. rail from the lumber company track taken up between Peter's Creek and Swiss. Bents of the Peter's Creek trestles rest on rock-filled cribs and on wood sills. A 20-ton Plymouth gasoline locomotive operates over the narrow-gage track from Lockwood.

NEXT MONTH: The second article of this series will describe methods of bridge construction, tunnel driving, and grading.



CONCRETE ARCH CULVERT, with heavy bench walls and relatively thin arch ring, and dump trestle for 48-ft. fill on general contractor's grading section.

May, 1930—CONSTRUCTION METHODS.



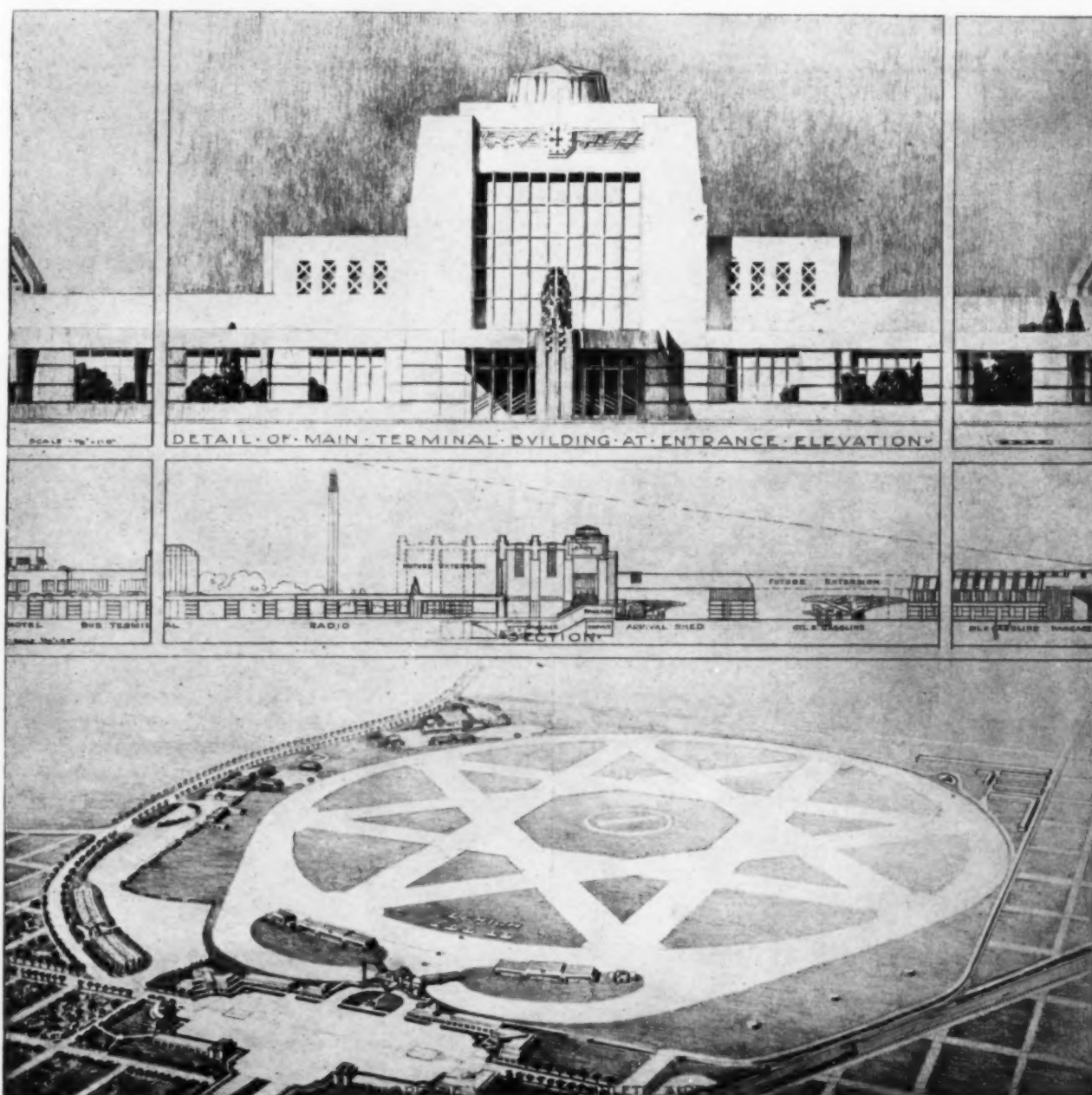
Fourth Design Prize Won by CIRCULAR AIRPORT

FOURTH PRIZE of \$500 in the Lehigh Airports Competition, sponsored by the Lehigh Portland Cement Co., was awarded to Will Rice Amon, architect of New York City, for his design of a modern airport to serve a typical American city.

The designer has adopted a circular flying field with parallel runways crossing the field in four directions and separating incoming and departing planes. A modernistic main terminal building, with covered wings for loading and unloading passengers, is placed at the

edge of the field facing a plaza surrounded by stores, shops, a hotel and other structures serving the needs of a busy airport.

First, second and third prize designs were shown in the February, March and April issues.



Ninety Gas-Engine Driven Mexico's First Arc-



GASOLINE for the ninety welding machines is supplied from these tanks mounted on a truck which travels along the pipe line route and makes refueling a convenient process.

*Contractor Prepares
165-Mile Route for
Transportation of
Natural Gas From
Texas to Mexico*

perienced laborers to do the welding as well as to operate the excavating machinery. Construction was started from both the United States and the Mexican sides of the Rio Grande, the two gangs working toward each other.

Welding Operations—In the construction of this line, as is customary on all pipe lines fabricated by the arc-welding process, the pipe was distributed along the right-of-way and lined

NINETY gas-engine driven welding machines were mobilized into service by Smith Brothers, Inc., general contractors of Dallas, Tex., for the construction of Mexico's first arc-welded pipe line recently completed for the Compania Mexana de Gas, a subsidiary of the United Gas Co. This new 12-in. natural gas pipe line, 165 miles long, runs from Aquilares to Roma, Texas, then across the Rio Grande River, via the International Bridge to San Pedro, Mexico, and thence to Monterey, Mexico.

Difficulties—The difficulties experienced in the construction of this Mexican line were many and varied. It was laid over mountains, through primitive forest and across rivers. Most of the labor used was inexperienced because of the Mexican law



BURROS transport Mexican laborers to and from the pipe-welding job.

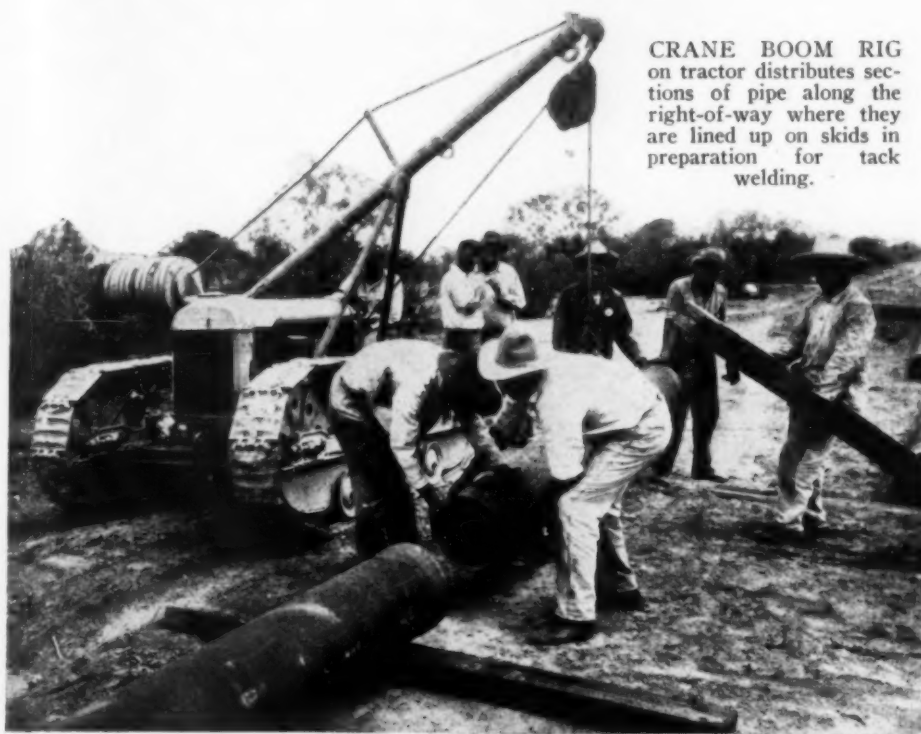
which required that most of the work be done by native residents of the state in which the work is going on. It was necessary to train these inex-

up in sections ahead of the firing-line welders by crawler tractors equipped with crane boom attachments. These sections are composed of from 6 to 8



REGIMENT OF MACHINES mobilized and awaiting travel orders to various locations where they will provide current for pipe-welding operations.

Machines Supply Current for Welded Pipe Line



CRANE BOOM RIG on tractor distributes sections of pipe along the right-of-way where they are lined up on skids in preparation for tack welding.

welders was supplied from a truck as shown. Some idea of the welding equipment used in the construction of this line may be gained from the photograph at the bottom of the opposite page which shows the line-up of welding machines ready to be moved into place along the route. The electrodes or welding wire used in welding the joints was of $\frac{3}{16}$ -in. diameter. All of the welding machines and electrodes used in the construction of this line were manufactured by the Lincoln Electric Co. of Cleveland, Ohio.

Installed largely by Mexican labor, as required by Mexican law, the Aquilares-Monterey 12-in. arc-welded pipe line is the first of its type to carry natural gas in Old Mexico.

FIRING-LINE WELD (below) is made by native operator who then proceeds to make burning-in and finished welds.

lengths of pipe, lined up on skids and tack welded by the welding operator assigned to the section. After the tack welds have been applied to a complete section, the welder returns to the first joint and applies the burning-in bead half way around the circumference. The pipe then is turned and the remaining half is welded. The operator's helper follows him across the section, cleaning the burning-in weld in preparation for the finished weld. While the finished weld is being applied the helper turns the pipe so that the finished weld may be completed in one continuous operation. A Mexican operator making a firing-line weld is shown in one of the photographs.

As the sections are completed they are placed over the trench on skids and the tie-in welds are made by the bell-hole gangs. In making these connections the weld must progress around the pipe as it remains stationary because it is impossible to turn the entire line.

Of the 90 welding machines which supplied the current for welding, 48 were used on the portion of the line in the United States and 42 on the Mexican portion. The welders were moved into position along the line by Caterpillar tractors. Gasoline fuel for these



Boston & Maine Terminal Combines RAILROAD STATION AND COLISEUM

*Old Structure in Boston
Wrecked and New One
Built Without Halting
Train Movements*

THE financial experts of the Boston & Maine Railroad found that they could have a new North Station Terminal Building in Boston to replace the old station built in 1894, and at the same time increase the railroad revenue. This was made possible by including in the new building an up-to-date coliseum above the railroad station, and leasing it to the Boston Madison Square Garden. The increased rentals from this lease and from other concession spaces were more than sufficient to take care of the charges on the investment.

The station faces on Causeway St., between Haverhill and Nashua Sts.,

the dimensions being 440x205 ft.; the station facilities occupy the ground floor and mezzanine, with a total height of 22 ft. The station ceiling is applied to the underside of the heavy concrete slab which forms the floor of the coliseum. This is practically a duplicate of the Madison Square Garden in New York with a clear height to the trusses of 67 ft. and a seating capacity of 18,000.

In laying out the construction, primary consideration was given to the continuous operation of the station, one of the busiest in the country, handling 360 trains a day, involving train movements during rush hours averaging 30 sec. apart. The old train shed was demolished by locomotive cranes working on the tracks between rush hours, and not more than two of the twenty-three terminal tracks were available for construction purposes at any one time.

Before wrecking the station building

By WALLACE E. BELCHER

*Supervising Engineer,
Dwight P. Robinson & Co., Inc.*



PILEDIVING was done with three rigs equipped with 65-ft. timber leads and 5,000-lb. steam hammers. New piles had to be located to miss old piles and other underground obstructions. Special caps were designed to fit each case. CONCOURSE PASSAGEWAY ROOF (in oval) was removed one section at a time to permit piledriver to enter from side.



COLISEUM FLOOR, convertible to hockey rink or boxing arena for 18,000 spectators, is a heavy concrete slab forming ceiling over railroad station below.

a temporary concourse of timber construction was built in the old concourse, and above this the wrecking and later the new construction work was carried on. For passengers crossing the 100-ft. space between the concourse and Causeway St. covered passageways were built, and shifted back and forth as the work progressed.

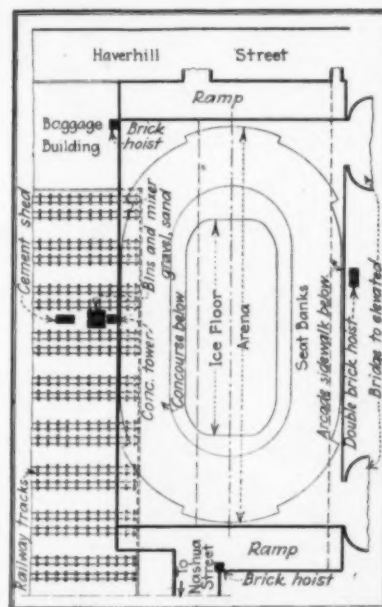
Foundation Work Difficult—The driving of piles under the concourse area was accomplished by removing one section of the roof at a time so

that the driver could enter from the side far enough to place the piles. The foundation work was difficult, as the old footings were all heavy granite blocks on closely driven wood piles and the foundations of former buildings and dock walls were much in evidence. A greater quantity of old rock was taken out than the quantity of earth excavated. Neither the piles nor the sheet piling could be driven through the old rubble work, nor could any of the old piles be pulled, although pulls

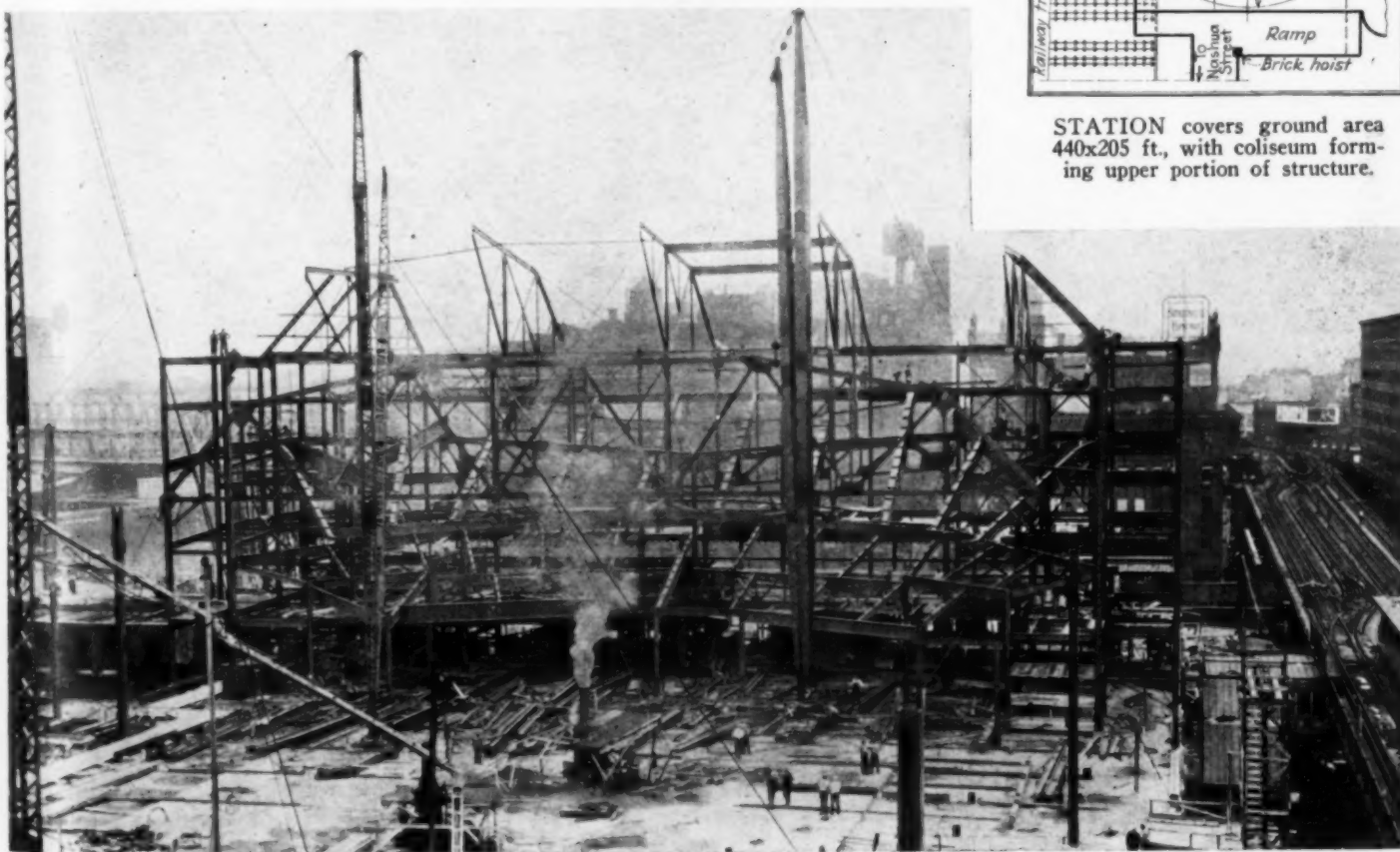
of about 60 tons were applied, which resulted only in breaking up the piles or breaking the rigging. The new piles were consequently driven to miss the obstructions as near to the desired location as possible, and special caps designed to fit each case.

Pile-driving was done with 5,000-lb. Vulcan steam hammers to a penetration of eight blows per inch, Simplex poured-in-place concrete piles being used. Concrete for foundations and piles was handled by special buckets, moved on industrial track. The New England Foundation Co. used three pile-drivers with 65-ft. timber leads, equipped with 9x10-in. Lambert hoisting engines.

Concreting Plant—The size of the



STATION covers ground area 440x205 ft., with coliseum forming upper portion of structure.



ROOF TRUSS ERECTION is handled by 25-ton guy derricks with 125-ft. masts and 116-ft. booms. Main trusses, assembled in upright position and raised to tops of columns, have span of 175 ft. and weigh 40 tons each.

superstructure and the requirement of 15,000 cu.yd. of concrete dictated the use of a central concrete mixing plant and high tower for gravity distribution. A 20-ft. platform between two passenger tracks was developed as a concrete plant, sand from one track and gravel from the other being received and placed in bucket elevators and storage bins. A Blaw-Knox 72-ton steel bin, and batch-measuring outfit were used, delivering to a 1-yd. Ransome mixer, and thence to the tower skip. The rate of capacity of the plant was 40 cu.yd. per hour and the biggest day's run 700 cu.yd. when pouring the triple ramp at either end of the structure.

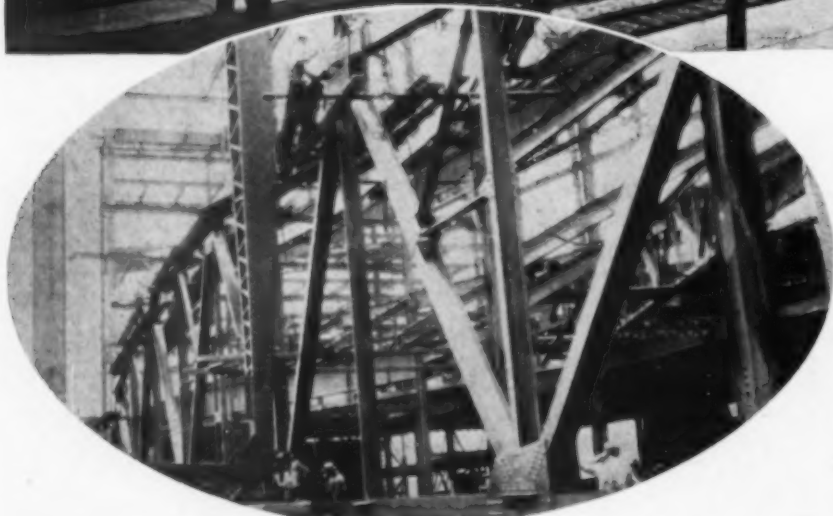
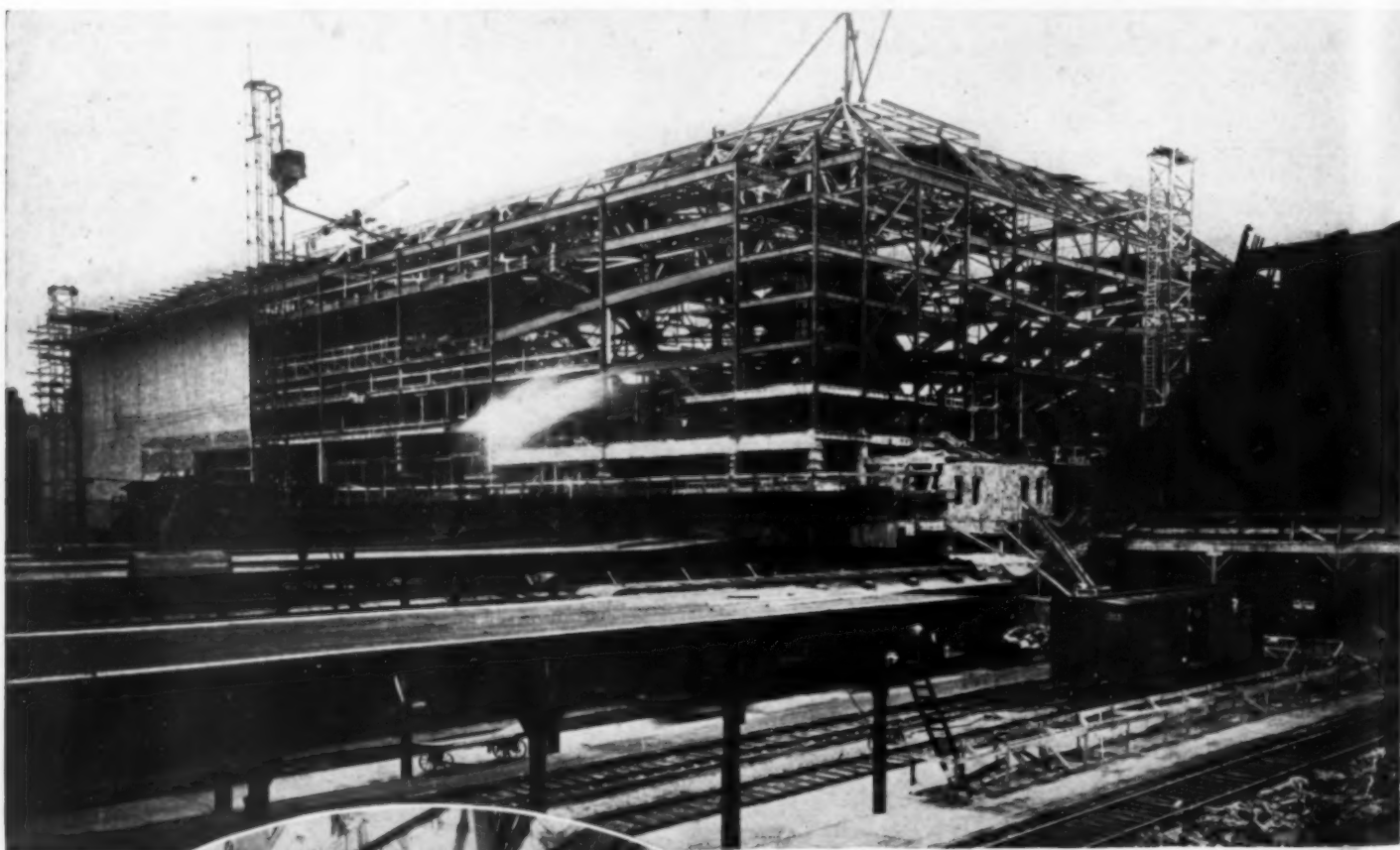
The limited storage space available at the job for handling mortar mate-

rials and the fact that an ample supply of ready-mixed mortar could be purchased for delivery as wanted led to the use of Blue Diamond mixed mortar delivered by truck. The brick hoists were placed in locations just outside the building walls, convenient for truck deliveries, not only of mason material but also for miscellaneous materials of all kinds.

Steel Erection—Steel erection was carried on by the George F. Watts Co. in two sections, the lower portion amounting to 1200 tons being erected by a stiff-leg derrick with 105-ft. boom, moving along the station roof deck as it was built. On this deck two 25-ton guy derricks with 125-ft. masts and 116-ft. booms were set up for erecting

the 2600-ton coliseum superstructure. The main trusses, spanning 175 ft. and weighing about 40 tons each, were composed of rolled beam sections shipped knocked down. These were assembled in an upright position on the deck, directly under their final position. They were then hoisted vertically by the two derricks and set into the tops of the main columns. This reduced the amount of riveting aloft to a minimum. Roof details were set by two 3-ton jinniwinks on the roof level.

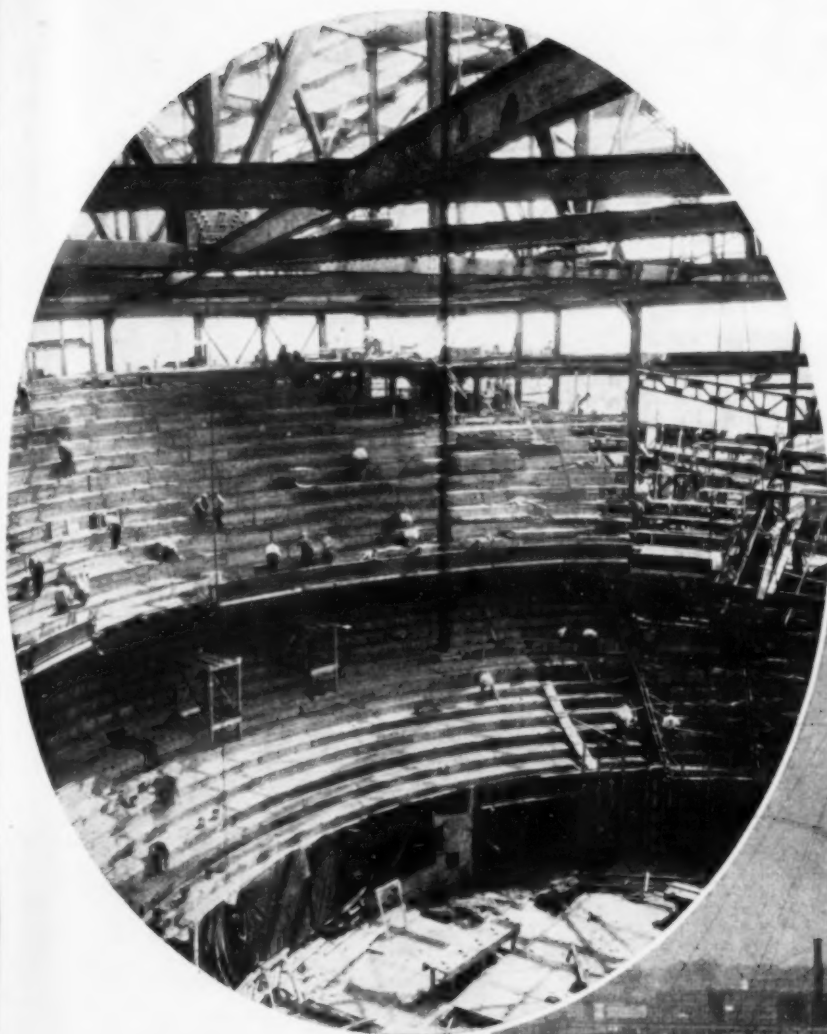
All the steel was painted before the roof slab was placed, thus avoiding the erection of special scaffolding for painters which would have been extremely expensive for this height of roof.



STEELWORK called for the placing of 3,800 tons. Roof details were placed by two 3-ton jinniwinks. TRUSSES (in oval) were raised to place as units, after they had been completely assembled on the ground, thus reducing riveting aloft.

Roof Slab—No forms were required for the poured-in-place gypsum roof slab. The steel tees for the roof were spaced 2 ft. apart and on the flanges of the tees Acoustex sound-absorbing slabs were laid, which were 2x6 ft. in size and 1-in. thick. This formed the permanent underside of the gypsum slab and at the same time assured perfect acoustic properties for the arena. It is doubtful if wooden forms could have been erected as cheaply as the Acoustex material, which cost about 22 cents per square foot in place.

Fireproofing of the heavy girders was a large item and the amount of form work required had to be kept down to a minimum, both on account of the time available as well as the cost. This fireproofing was accomplished by casting a gypsum shoe around the lower



TIERS OF SEATS (above) were installed in the coliseum portion of the dual purpose structure after the steel-work had been erected and riveted.

flange of the girder and following up by laying 3-in. fireproofing blocks on each side of the girder for the protection of the girder webs. This was later plastered with one rough coat to present a uniform appearance, with the exposed concrete work on the underside of the seat banks.

Such buildings usually require large areas of steel sash and the storage of the sash occupies considerable space. The sash is very likely to be damaged in rehandling and rough usage before it can be used. In this case early delivery of sash was avoided by the use of rolled steel subframes which were set into the masonry walls as they were built. This permitted the masonry work to be finished up as scaffolding was advanced and assured perfect fit for the sash when delivered.

The total cost of the work was \$3,500,000, all of which was completed without serious injury either to the public or to any of the employees, and without delay to train movements.

Demolition commenced Dec. 3, the station portion was put into use Aug. 20, and the coliseum opened Nov. 17

with a capacity audience, the first ice hockey game being played Nov. 20, 1928.

The work was under the direction of W. J. Backes, chief engineer, and F. C. Shepherd, consulting engineer of the Boston & Maine Railroad. The architects were Funk & Wilcox of Boston and Fellheimer & Wagner of New York. Dwight P. Robinson & Co., Inc., were the designing engineers and constructors.

NEXT MONTH: Building the Salt Springs dam on the Mokelumne River, California, a rock-fill structure of 3,000,000 cu.yd. involving large scale quarrying operations by the Pacific Gas & Electric Company.



TAIL TOWERS AND CHUTES distributed concrete from a central mixing plant producing 40 cu.yd. per hour. For poured-in-place gypsum roof sound-absorbing slabs replaced wood forms.

Getting Down to

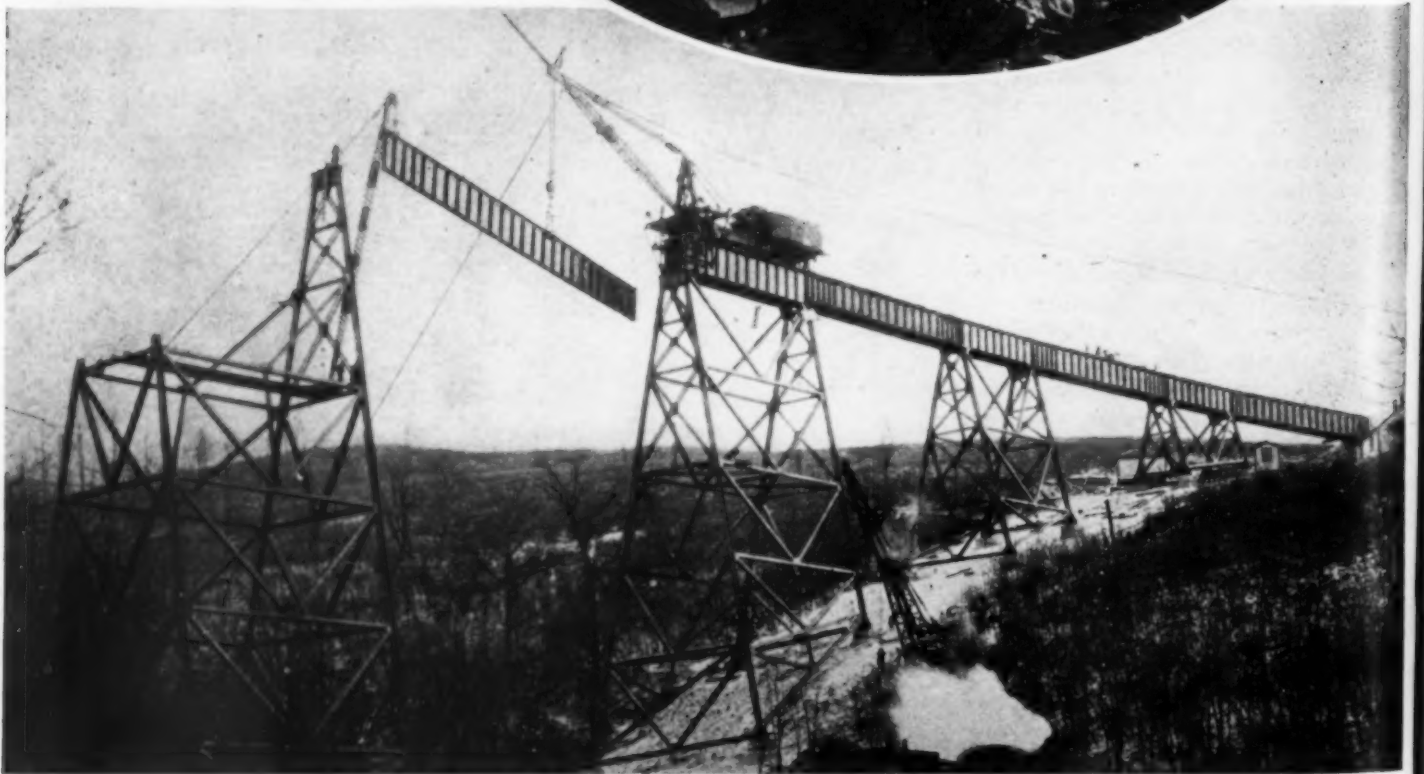
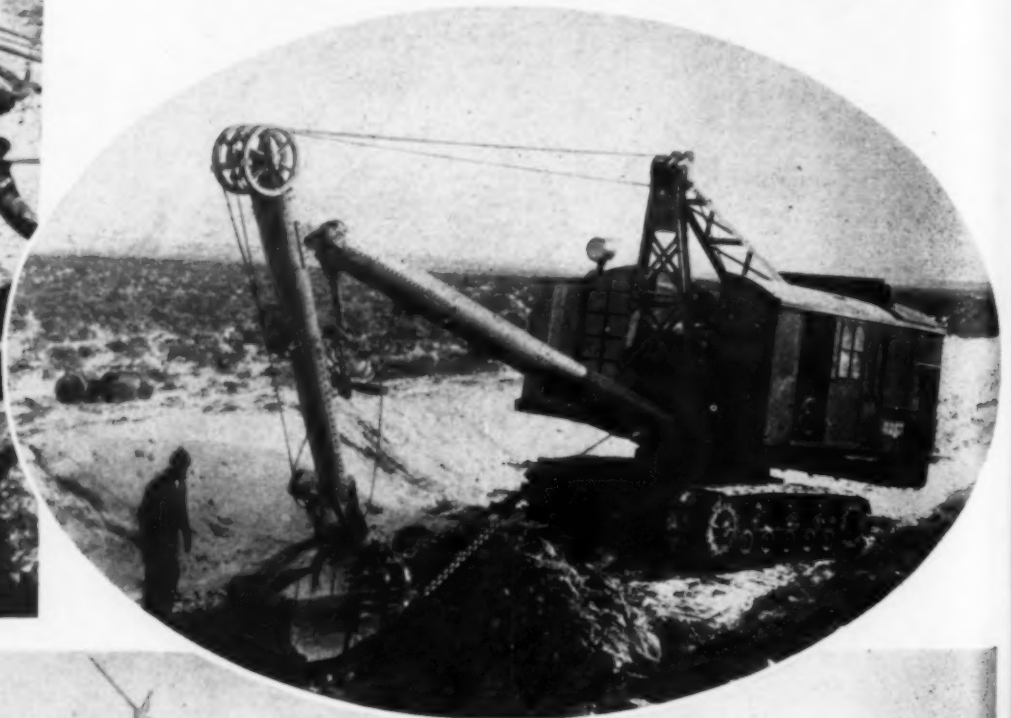
DETAILS

Close-up Shots
of Job
Methods and
Equipment



SUSPENDED (*left*) from cables stretched across canyon, two Byron-Jackson deep well pumps, with 6-ft. columns, driven by 75-hp. G. E. induction motors, unwater Owyhee dam site for General Construction Co. Winch on platform raises and lowers pump.

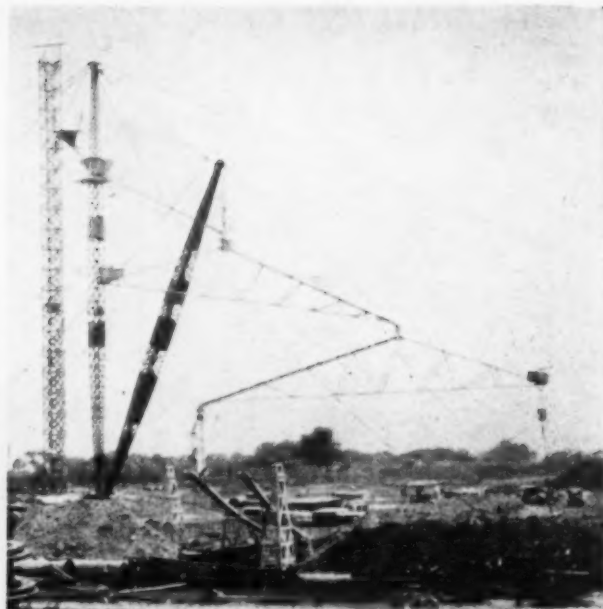
TUBULAR BOOM AND BUCKET ARM (*below*) feature Page 1-yd. hoe attachment on 75-hp. P&H excavator digging North Branch Canal on Kittitas Division of Bureau of Reclamation's Yakima Project.



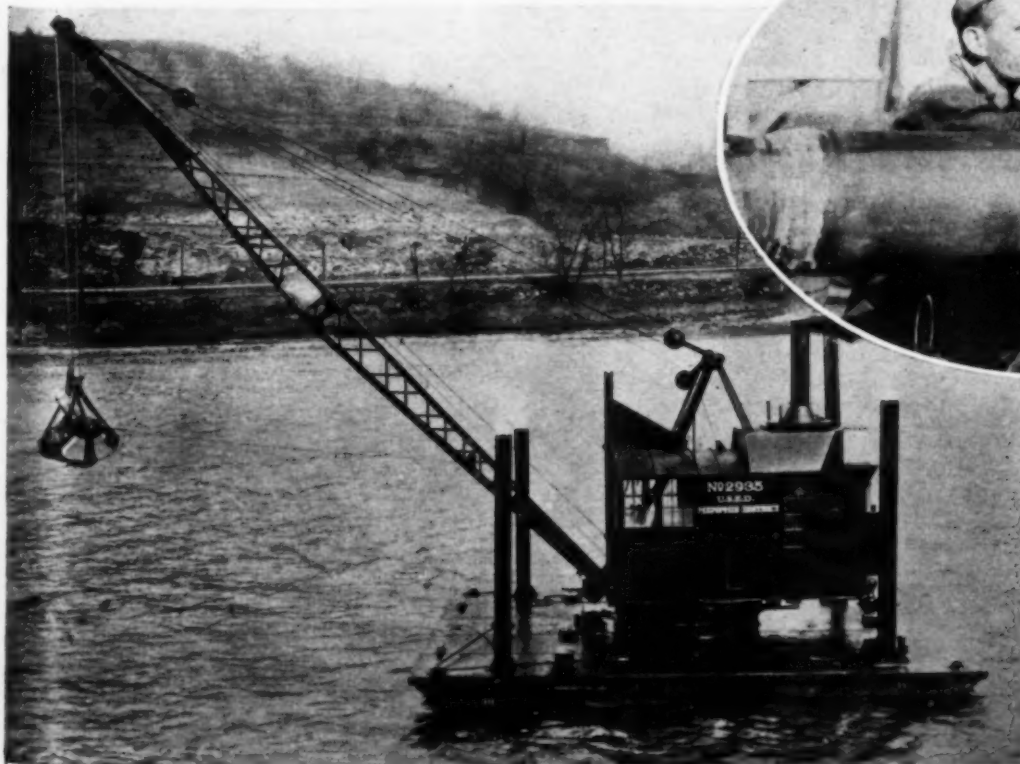
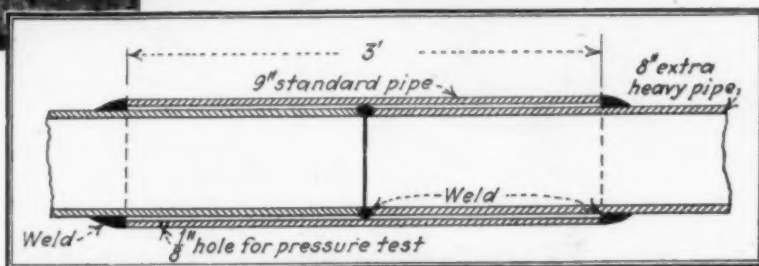
CHICAGO BOOM ASSISTS DERRICK CAR in placing 69-ton girder, 122 ft. long, on Pigeon Creek viaduct of Pittsburgh & West Virginia Railway near Monongahela, Pa. Note brackets at front of derrick car to prevent overturning. McClintic-Marshall Co., contractor. Photo from G. A. CAFFALL, Manager of Erection, McClintic-Marshall Co.



GRADING DIALS enable rough grading crew to blade subgrade accurately. Madison Construction Co., Edwardsville, Ill., uses these dials at 50 ft. intervals to obtain close preliminary grading and cut down labor of fine grading. Hands are set to indicate whether grade is high or low and by how much.



GUY DERRICK carries concrete chuting system at San Antonio, Tex., sewage disposal plant. J. DePuy, San Antonio, general contractor. Photo from H. R. F. HELLAND, Associate Engineer, Hawley & Freese, Consulting Engineers.



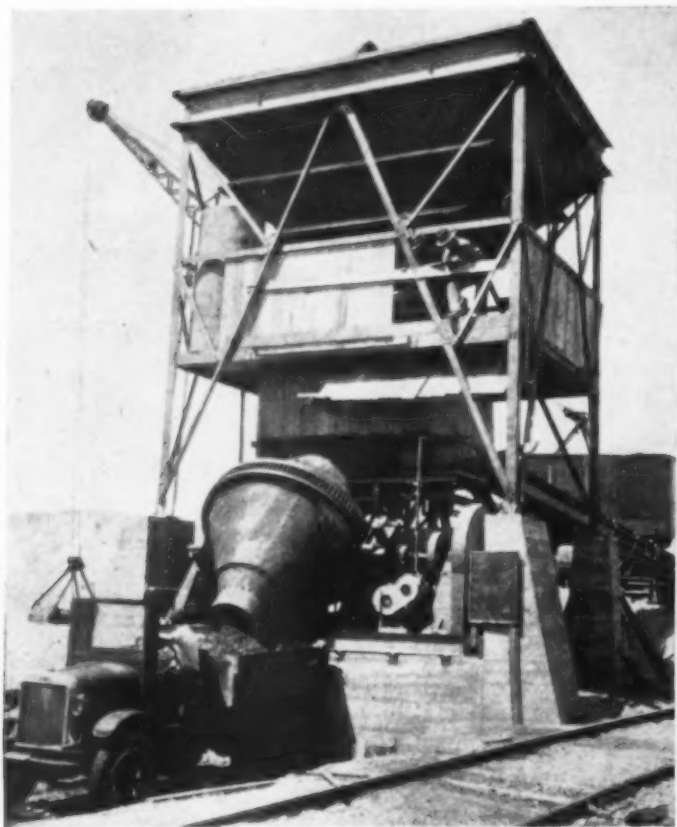
STEEL-HULL WHIRLER-DERRICK BOAT built by Dravo Contracting Co., Pittsburgh, serves U. S. engineers on Mississippi River work in Memphis district. Steam-operated, full-revolving derrick handles 2-yd. clamshell bucket or 2-yd. drag scraper bucket on 75-ft. boom.



REINFORCED JOINT (above) for submarine gas pipe facilitates construction and testing. Central Hudson Gas & Electric Corporation welds joints on barge by oxy-acetylene process and lowers pipe to bottom of Hudson River as barge moves ahead. Linde compressed nitrogen takes place of air compressors in testing. Pressure of 350 lb. is applied to annular space between pipe and sleeve. Soap suds painted on sleeve welds indicate leaks at these welds. With sleeve welds tight, drop in pressure shows leak in butt weld.

Road Builder Lays 9½ Miles of Concrete from

CENTRAL MIXING PLANT



CENTRAL MIXING PLANT (left). Tilting mixer discharges quickly. Conveyor delivers loose cement to hopper above mixer.

CONVINCED by its success in using a central mixing outfit for the construction of a concrete road at Marietta, Ohio, in 1928, that this type of plant was both practical and economical, the Dunzweiler Construction Co., of Zanesville, Ohio, last year applied the same method to the building of 9.48 miles of 9-7-9-in. pavement 18 ft. wide on U. S. Route 24 at Kentland, Ind. Equipped with a fast-discharging Smith 2-yd. tilting mixer and a fleet of ten Hug 4-ton trucks, the Indiana plant was capable

of laying 125 ft. of pavement an hour. This capacity was based on a mixing period of 2 minutes after all materials were in the drum.

The old fears of the paving contractor who hesitated to try central mixing, viz., that the trucks could not be dumped clean and that the concrete would be too stiff to yield the mortar for a good finish, were definitely dispelled by the Dunzweiler Construction Co. No admixture was used in the concrete, and the truck bodies were the standard end-dump

Hug 3-yd. size, with side corners rounded.

It was vitally important to have the consistency of the mix just right—a wet batch or one too dry caused trouble in getting the concrete out of the trucks; wet batches, also, had a tendency to segregate while in transit. Even on the longest haul of 6 miles, no serious separation of constituents in the mix occurred when the proper slump was used. An average slump of 1½ in. was sufficient. The experience of the contractor demonstrated that the wetness of the mix had to be regulated in conformity with the roughness of the haul, condition of the truck body, humidity, and atmospheric temperature. Of these four factors, the roughness of the haul was most important.

To keep the trucks on a smooth roadway and to save the subgrade from rutting, the contractor was more particular than on most truck jobs that the grade should be dry and solid before trucking would be allowed on it. Time lost in waiting for satisfactory subgrade conditions was regained by the speed of operations once work was resumed. Trucks were pneumatic-tired, with dual wheels on the rear axle.

The second important factor, condition of the truck body, was kept under control by a thorough nightly



FINISHING EQUIPMENT consists of two finishing machines and a belting machine. Hand floating is reduced to a minimum.



TRUCKS DUMP WET BATCHES on subgrade. Little concrete adheres to clean steel bodies. Consistency of mix is varied to conform with roughness of haul, condition of truck body, humidity, and atmospheric temperature.

cleaning which removed all adhering mortar from the steel and left the body smooth and shining for the next day's run. By keeping the subgrade smooth and hard and the bodies clean, concrete was hauled and dumped practically in the same condition in which it left the mixer.

To put a perfect finish on the fairly stiff mix and to save time by eliminating excessive hand floating, the Dunzweiler Construction Co. used two Ord finishing machines and a Lakewood belting machine. After the two finishing machines had struck off the concrete, irregularities detected by checking with aluminum straight edges were removed by hand floating. The belting machine then finished the slab.

The central mixing plant was set up at the rock crushing plant of the Newton County Stone Co., about $3\frac{1}{2}$ miles from the east end of the job. Crushed rock was obtained from the stone company, and sand and cement were shipped in, the latter being supplied by the state. The 2-yd. mixer and Blaw-Knox bins were erected on concrete foundations. A cement storage shed of 10,000-bbl. capacity was connected with the mixing plant by a Barber-Greene conveyor 80 ft. long. Cement handlers dumped the cement from sacks on to the conveyor, which delivered the material to a hopper over the mixer. Fourteen sacks went into the 2-yd. batch. Aggregates were weighed in Blaw-Knox batchers. A

Koehring gasoline crane with a 60-ft. boom handled sand and stone in a 1-yd. clamshell bucket.

An electrically powered Barnes triplex pump supplied the mixer with

water. To guard against possible fluctuations in the power supply, a 1,000-gal. tank was placed on the mixing plant. Water was pumped to this reservoir through a 4-in. line, and the overflow was returned to a sump through a 2-in. pipe.

The specified mixing time for ordinary paving mixers in Indiana is 1 minute. Because of the unusual size of the mixer at the central plant, with the lower number of r.p.m., the engineers of the highway commission thought it advisable to increase the mixing period to 2 minutes, thus turning the batch over as many times as in the smaller mixers.

The results of beam tests showed higher early strength than beams broken on jobs where a central mixing plant was not used. This higher strength may be attributed to the longer mixing period. Beam tests showed no material difference in strength between batches which were in transit 30 minutes and those which were dumped 10 minutes after being mixed.

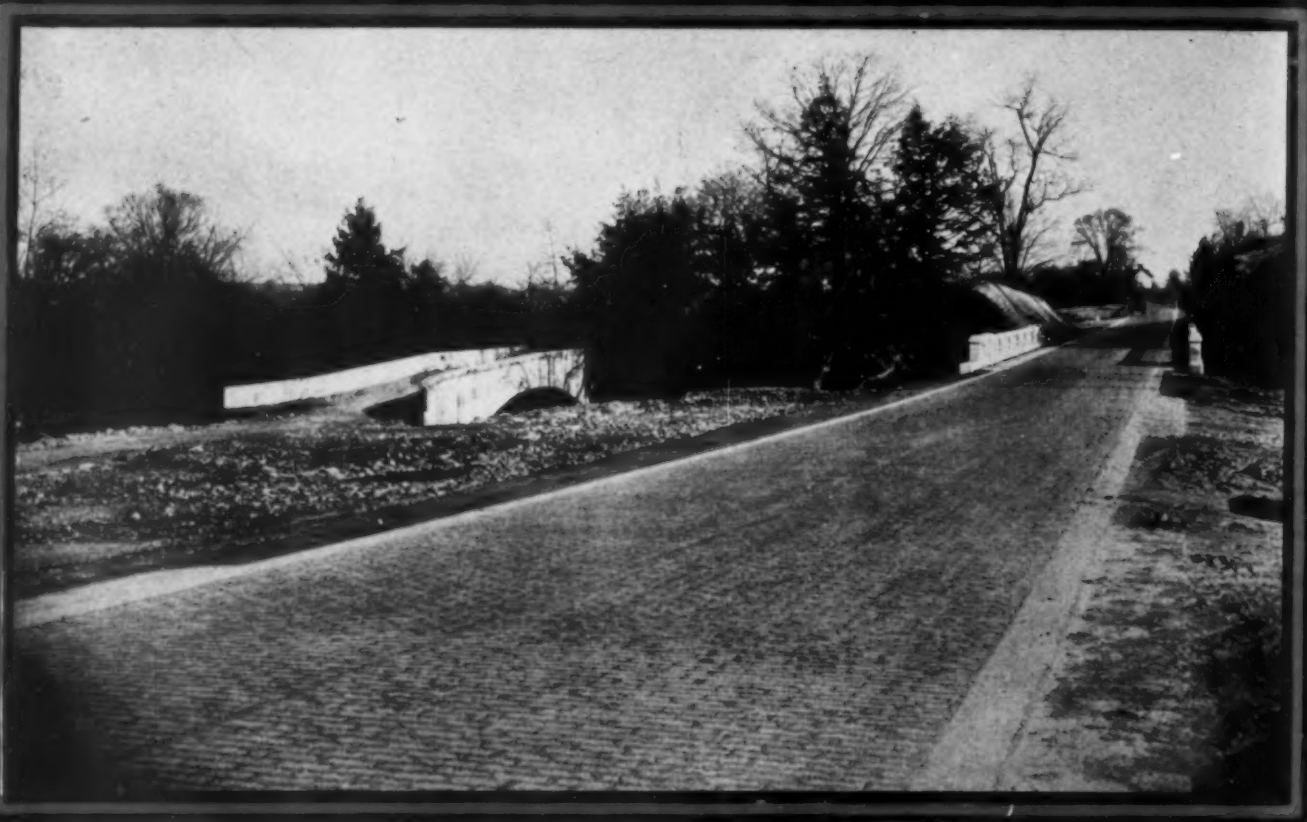
The contract section of the Dunzweiler Construction Co. was 80 per cent old location. Rough grading, amounting to about 45,000 yd., was sublet. Paving started July 3 and ended Oct. 8. The longest day's run was 1,135 ft.; the average day's run, based on full working days for the season, was 865 ft. Progress was not above the average for 1-yd. pavers.



G. L. BERRY (left), project engineer for Indiana State Highway Commission, and EARL MAXWELL, superintendent.

BRICK ROADS

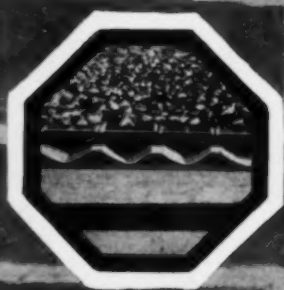
never wear out from the t



Face Brick

**METRO-
POLITAN
BESSEMER
& OLEAN**

he top down



Filter Tile

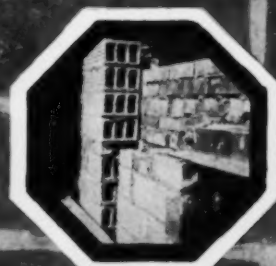
THIS is a known fact and accounts for the wide use of brick surfaced roads subjected to heavy travel both in the open and on the city street.

Freedom from glare, smooth riding and non-skid qualities of brick appeal to the rider. Long life, low maintenance and ease of construction are points of interest to the city official and contractor alike.

Metropolitan Bessemer and Olean are three brands coming from America's largest manufacturers of paving brick. Experience, facilities for manufacturing and centralized location are all advantages offered in specifying any of the three brands named.

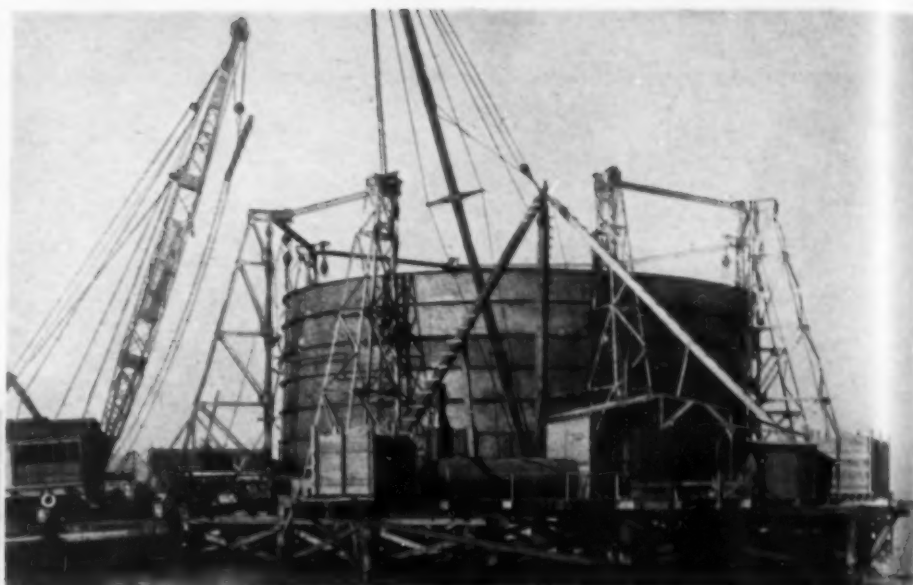
Try them on your next road job and learn for yourself the economy of high grade brick surfaced roads.

The Metropolitan Paving Brick Co.
CANTON, OHIO



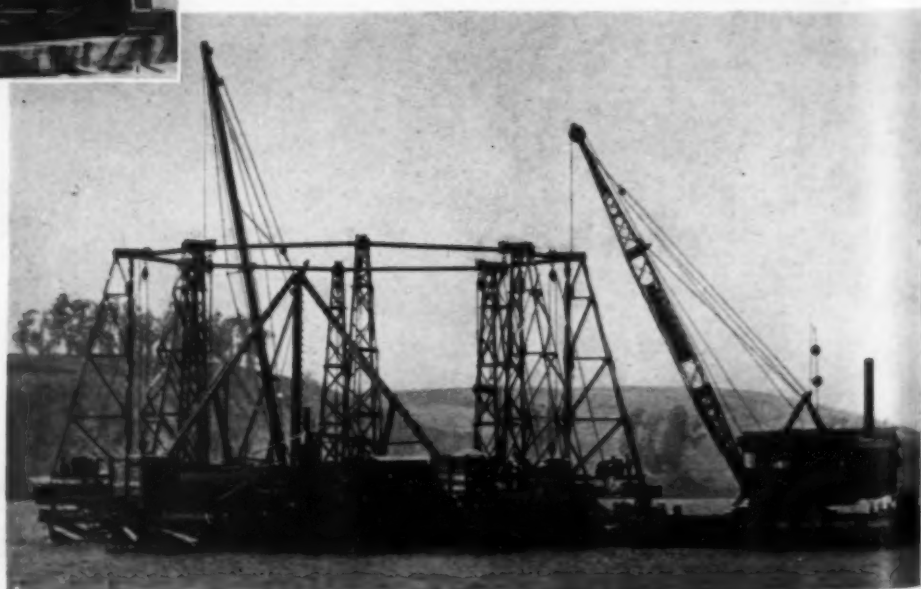
Structural
Clay Tile

- 1 STEEL CYLINDER to hold sand island is suspended from eight winch frames on falsework piles and is built up in 10-ft. rings. Diameter of shell is about 81 ft.



- 2 BEFORE LOWERING INTO WATER, (above) contractor completes fabrication of three rings, giving cylinder initial height of 30 ft.

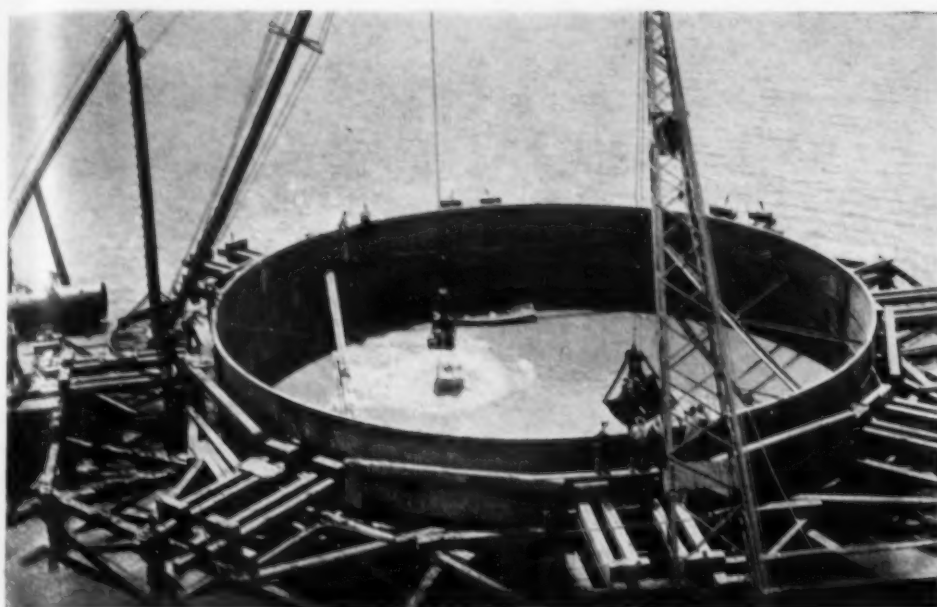
- 3 AS SHELL IS LOWERED THROUGH WATER, (right) rings are added until cylinder sinks into mud bottom at maximum depth of 55 ft. below water level.



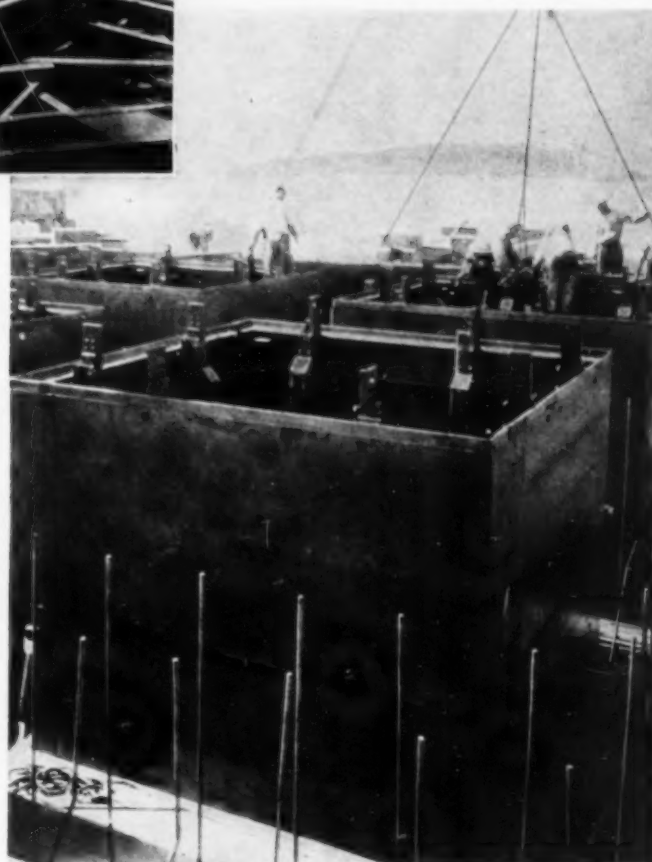
Step-by-Step Using Sand Islands Construct Deep Piers of

SAND islands in steel shells were the solution for the deep pier construction problems encountered by Siems, Helmers & Schaffner, Inc., of St. Paul, Minn., on the Southern Pacific Suisun Bay bridge now under construction. Working in water up to a depth of 55 ft. above mud line and contending with strong tides having a maximum rise of about 7 ft., the locating and constructing of piers presented unusual difficulties. The maximum depth to bedrock below water is 143 ft., and earthquake possibilities require that the piers extend to bedrock.

The eight main piers are being built by the method illustrated in the accompanying photographs. The deepest pier will be



4 WITH SHELL SUNK TO POSITION (*left*) derricks at some piers dredge out 10 ft. of mud. At other piers, no dredging is attempted before cylinder is filled with sand by clamshell buckets. Sand is obtained by dredging in bay nearby.

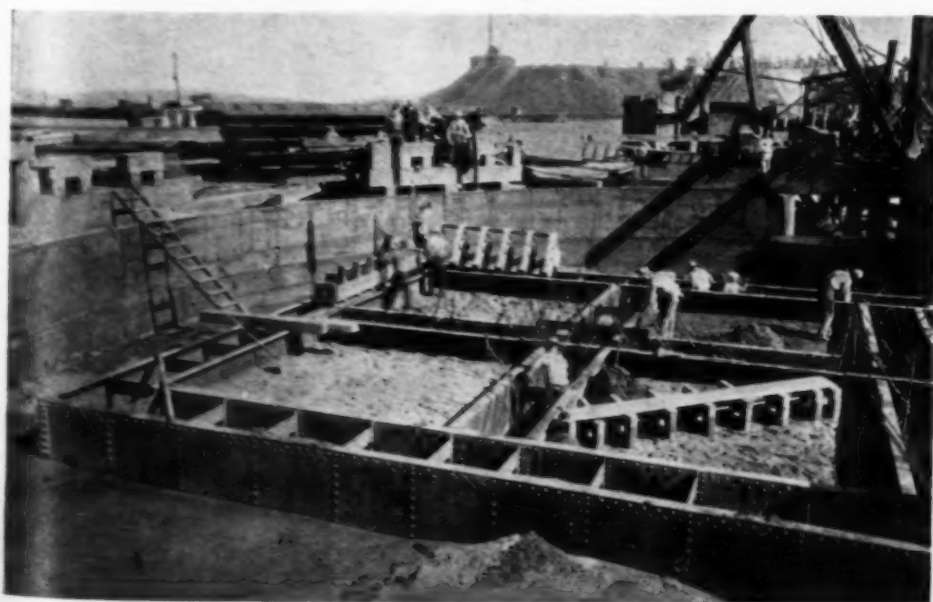


6 STEEL FORMS (*above*) are erected on cutting edge to make caisson walls. Walls between six dredging wells are 6 ft. thick.

Field Methods in Steel Shells to Suisun Bay Bridge

approximately 214 ft. high, from bedrock to bridge seat, and will contain about 13,500 cu.yd. of concrete and 175 tons of reinforcing steel. Heavy reinforcing, amounting to 30 lb. per cubic yard of concrete, is used in the pier bases.

In the field, the work is in charge of H. I. Benjamin, assistant engineer of bridges, under the supervision of C. R. Harding, assistant to the president, and W. H. Kirkbride, engineer of maintenance-of-way and structures. C. M. Kurtz, office engineer on the job, provided the accompanying pictures. For the contractor, N. F. Helmers, vice-president of the firm, is in personal charge, with C. E. Ryan as general superintendent.

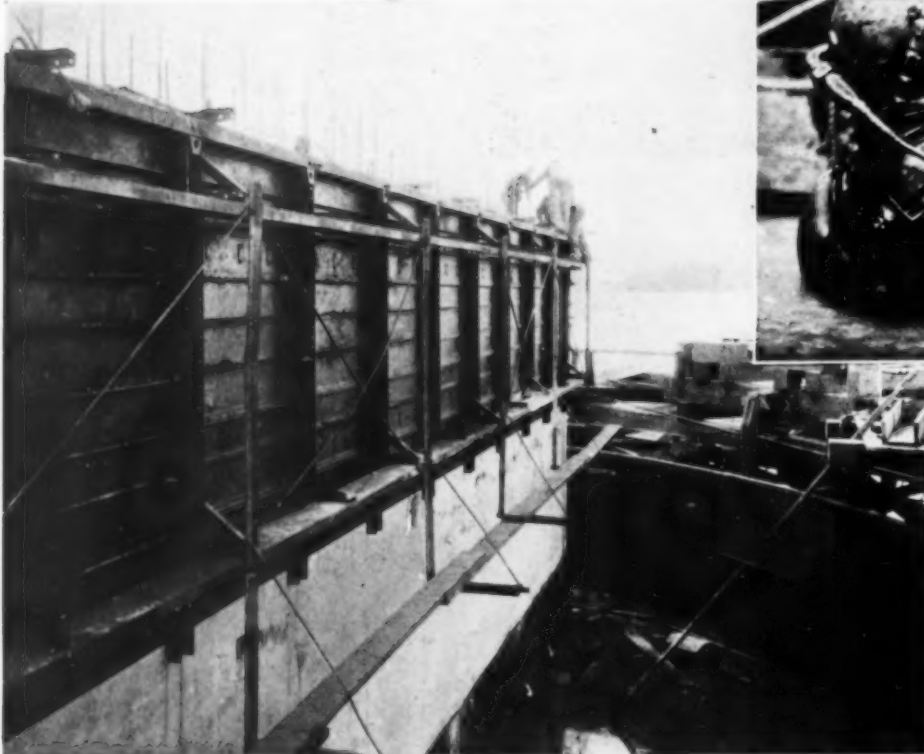


5 ON SAND ISLAND INSIDE SHELL, (*left*) workmen erect cutting edge of 40x60-ft. caisson. Cutting edge is located accurately on dry, stable surface.

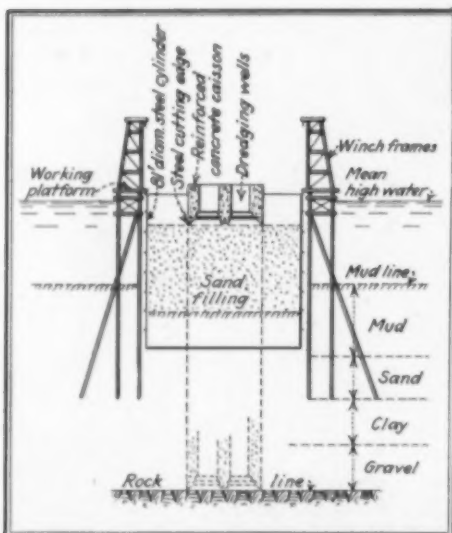
Step-by-Step Field Methods

(Continued)

Using Sand Islands for Deep Pier Construction



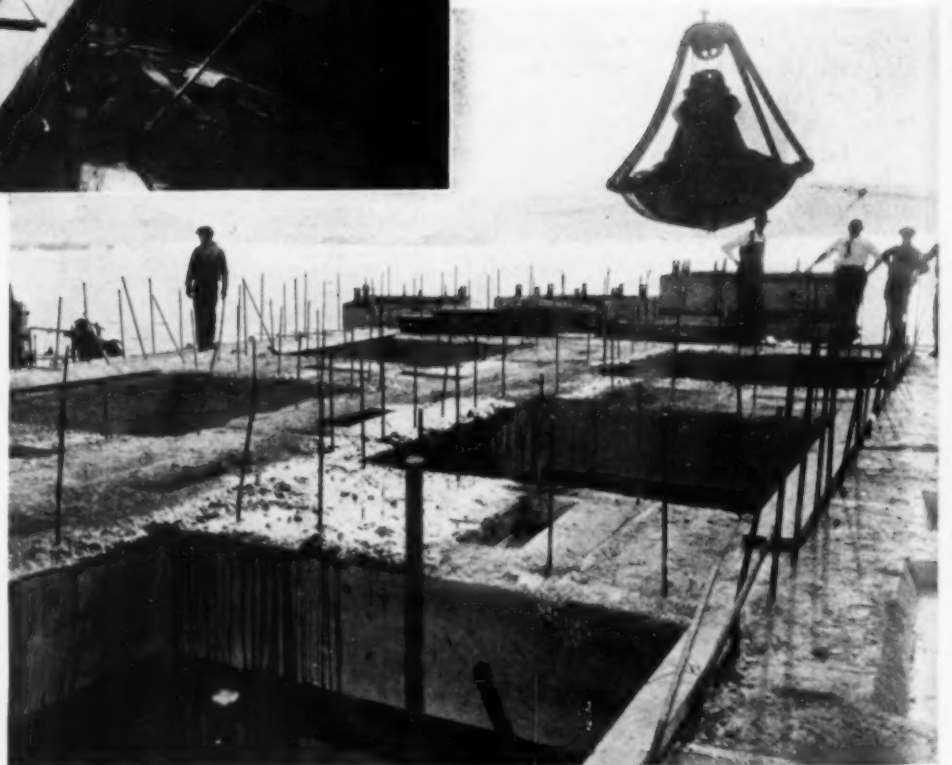
7 SLIDING FORMS move up to permit pouring of 10-ft. lift containing 500 cu.yd. each day. After concrete has been placed to height of 25 ft., dredging is started.



SKETCH of construction conditions and of contractor's scheme for sinking caisson through sand island inside steel shell.

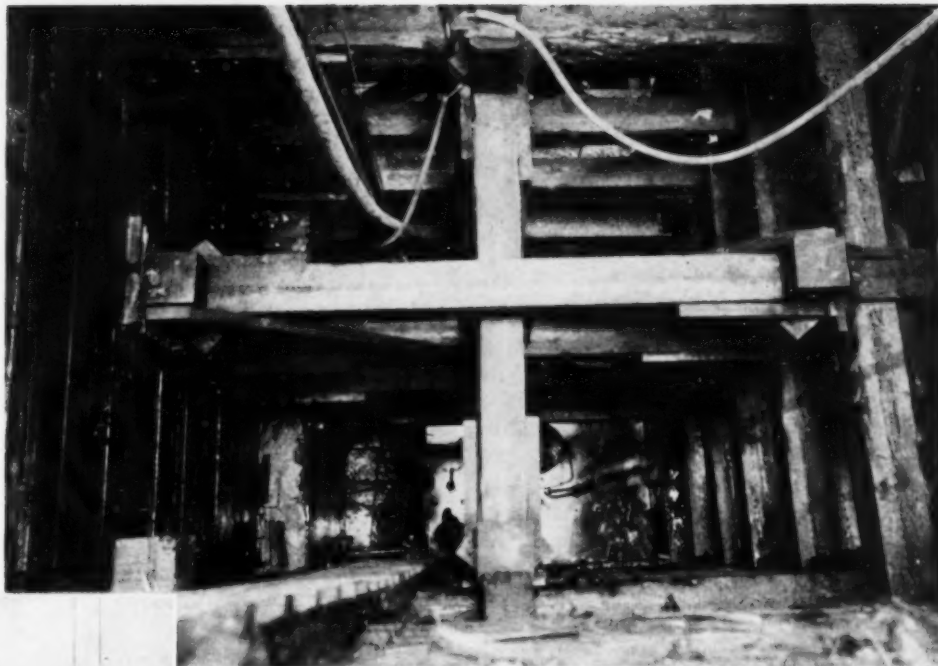


9 WHEN BEDROCK IS REACHED, divers inspect foundation conditions to see if cutting edge has penetrated hard shale.

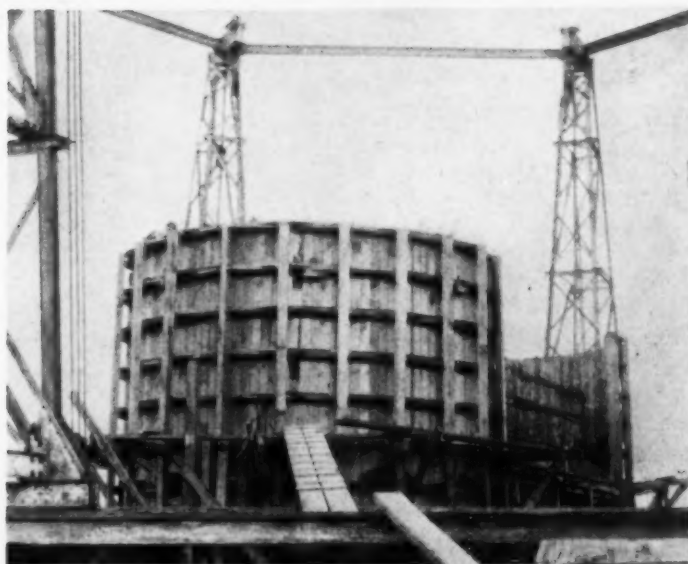
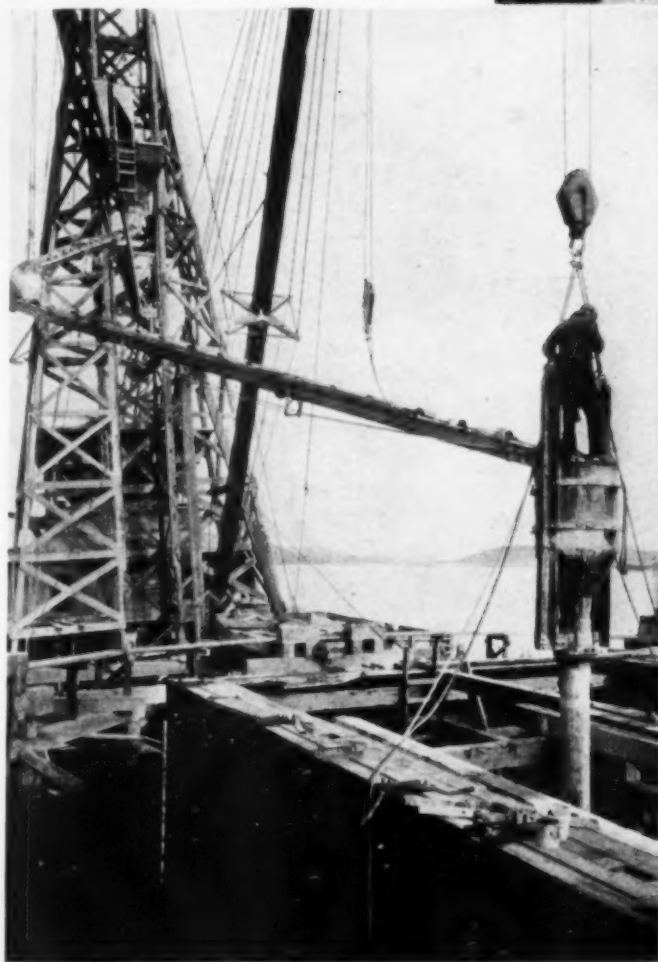


8 DREDGING WITH CLAMSHELL BUCKETS through six 10½x11½-ft. wells sinks caisson to bedrock at maximum depth of 143 ft. Dredging usually is done at night; 10-ft. concrete lift is added during day. By regulating dredging among different wells, caisson is kept plumb. As sinking progresses into stiffer blue clay, excavation sometimes extends to 5 or 6 ft. below cutting edge, and contractor resorts to dynamite to start caisson moving. Timber cofferdam is placed on concrete caisson above El.-20.

11 LOOKING DOWN INTO DREDGING WELL, (right) after 30-ft. seal has been placed and well has been unwatered. Rest of concrete is poured in dry.



10 CONCRETE IS PLACED BY TREMIE (below) to seal dredging wells to height of 30 ft. above rock bottom.



12 ROUNDED-END PIER rests on caisson. This pier extends from El.-20 to 70 ft. above water.

13 FLOATING CONCRETE PLANT pours caisson and pier. Plant includes 2-yd. mixer and 100-ft. tower. Materials are delivered by barges.



Sixth of a series of articles on
the \$325,000,000 construction
program for flood control
in the Mississippi Valley

The Defense Against OLD MAN RIVER-VI

By ROBERT K. TOMLIN
Editor of *Construction Methods*

LARGE-CAPACITY machines for levee building in the Mississippi valley are represented by two outstanding, but radically different, types: the tower-cableway excavator and the long-boom dragline. Bucket sizes for the tower machines range from 5 to 10 cu.yd. and for the big draglines, with boom length as great as 150 ft., from 4 to 6 cu.yd. Both ma-

Tower-Cableway Excavators and Large Draglines

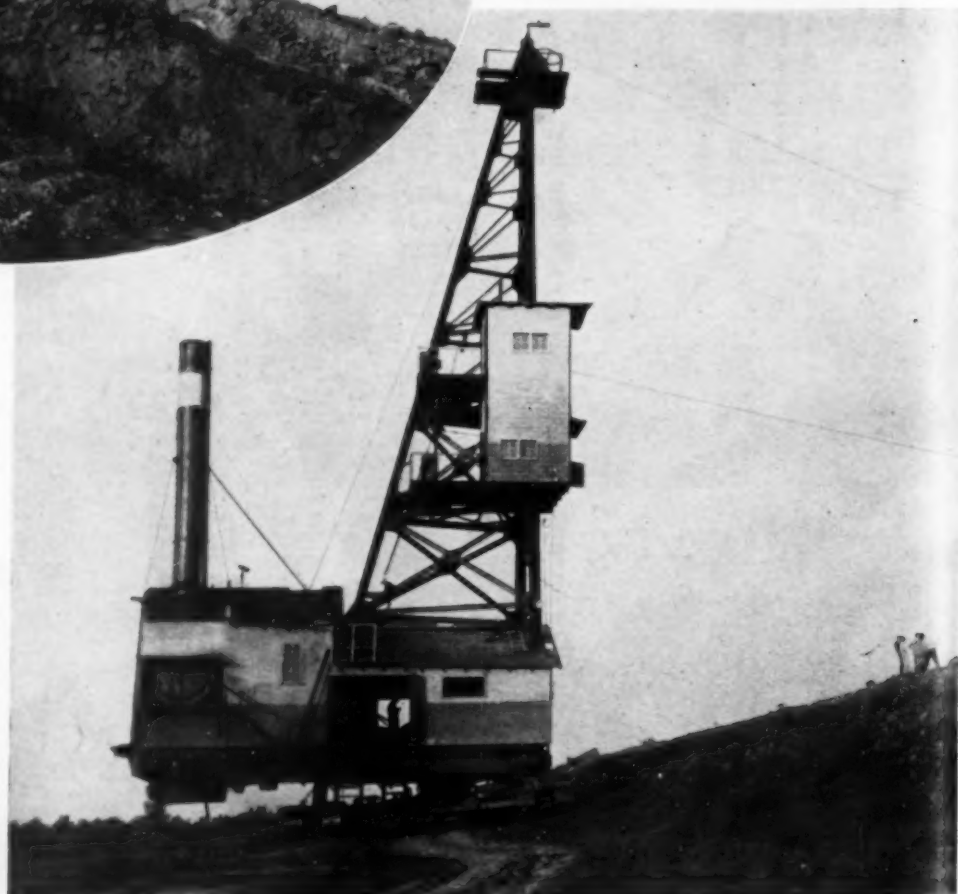
Tower-Cableway Excavators—The tower-cableway excavator, in addition to its power plant, comprises four major elements: (1) A head-tower or structural steel frame extending to heights of from 70 to 100 ft. above ground and mounted on large double crawler tractions; (2) a tail-tower about 35 ft. high, also on crawlers; (3) a wire rope track cable spanning the borrow pit between head-tower and tail-tower; (4) a digging bucket of from 5 to 10 yd. capacity, carried out on the track cable and hauled in by a drag cable from the head-tower. While tower machines place the bulk of the fill directly within the limits of the levee sections they are supplemented by draglines for rehandling a small percentage of the yardage, shaping the section, trimming slopes and other miscellaneous duties.



LEVEE ENLARGEMENT (above)
with tower-cableway bucket, showing
new fill on old levee section, with sur-
face plowed to provide bond.

chines are heavy, costly units, adapted particularly to large-volume, continuing contracts that justify a substantial initial plant investment.

Where the specified limitations of wide, shallow borrow pits make it necessary to skim off earth fill far back from the toe of the levee the tower-cableway machine, with its reach of 700 ft. or more, has proved its effectiveness as a levee builder during the past dozen years. With a couple of exceptions the tower machines are owned and operated by the U. S. Engineer Department, which began purchasing them in 1918. While Government equipment also includes a few large draglines most of the machines of that type are in the hands of the contractors.



HEIGHTENED TOWER MACHINE with steel frame raised about 25 ft., placing top 100 ft. above ground level. Machine stands on banquette of old levee.

All of the Government tower excavators now in service are steam operated, a typical power plant including a 180-hp. boiler, 250-hp. main engine and 50-hp. tracking engine in the head-tower, and a 50-hp. boiler and 50-hp. propelling engine in the tail-tower. As the machines are generally operated two 10-hour shifts daily they are equipped with flood lights served by

6 to 10-kw. steam-electric generating units.

Used principally for raising and enlarging existing levees to the new lines and grades of the present superflood levee section the machines operate with the head-tower on the banquette or slightly inclined shoulder of the land-side slope of the embankment and the tail-tower just beyond the far limits of the borrow pit. No part of the plant except the bucket, therefore, is in the pit, as is the case with elevating graders, tractor-wagon outfits, drag-lines and other types of levee-building equipment. This is one of the big advantages of the tower-cableway, especially under conditions of wet, soft

borrow pits encountered so often on Mississippi flood control construction after rains or during high river stages.

Another desirable characteristic of the tower machine is its long reach. The significance of this feature is apparent when it is realized that the enlargement of existing levees necessitates the working of extended borrow pits already partially depleted of



SCRAPER BUCKET on tower cableway. Size indicated by men cleaning out bowl.



©Harris & Ewing



BOTTOMLESS BUCKET is one of many types used on tower-cableway machines.

material and that the Government's specifications place rigid limitations on the depth of cut permissible to secure new earth fill. In the Memphis and Vicksburg districts borrow may not be taken from a point closer than 40 ft. from the levee toe. At the end of this 40-ft. berm the cut starts at a 1 on 2 slope down to a 3-ft. depth and thence extends on an extremely flat slope (1 on 50) to the outer edge of the pit.

Excavation for levee enlargement,



ORIGINAL HEIGHT of about 70 ft. is maintained on this tower. (In oval) MAJOR JOHN C. H. LEE, Vicksburg district engineer.



E. S. MAUPIN, engineer in charge of Northern area, Vicksburg district



TAIL TOWER of cableway machine operates on bank back of borrow pit.

therefore, especially in borrow pits that have previously been used, is essentially a light, surface-skimming operation, with long haul, rather than a deep cut. Under these conditions it is apparent that in order to secure the required volume of new fill it is necessary to reach far out from the levee toe. With present spans of 700 ft. or more the tower excavator is well



BACK-HAUL CABLE is required on bucket when tower height is insufficient for gravity return to borrow pit.

adapted to this type of work. All of the tower units now in Government service on the river are products of the Bucyrus Company.

Higher Towers — An important change was made last year in some of the tower machines to adapt them to the more exacting requirements of present-day construction. As originally developed for the older and smaller levees, with borrow near at hand, head-towers 70 ft. high were

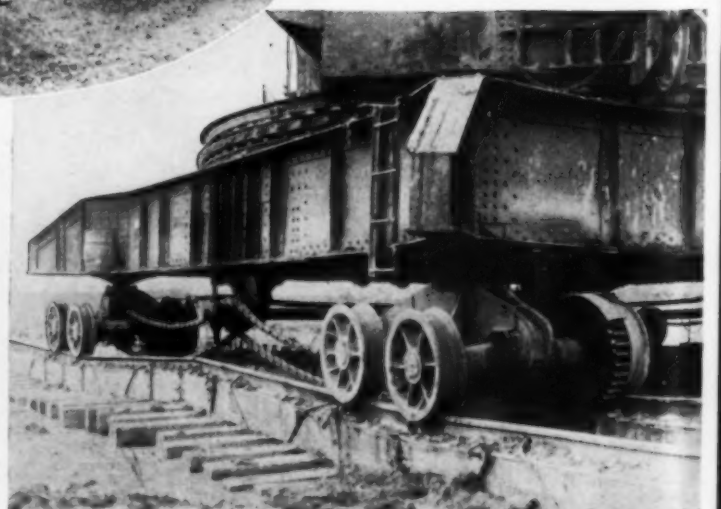
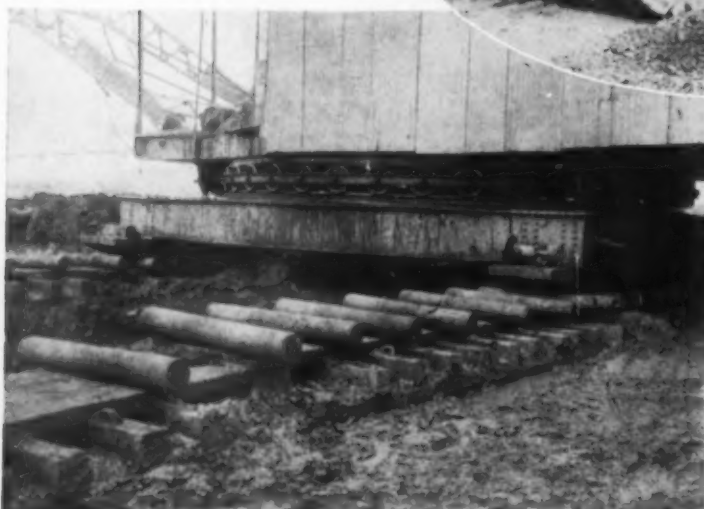
sufficient to provide a gravity return of the empty bucket along the track cable. With today's wide borrow pits for the enlarged levee sections it becomes necessary either to install a back-haul cable for the bucket or to raise the head towers. Both expedients have been employed. Several machines in the Memphis district have had their head towers raised 25 ft. or so (to heights of about 100 ft.) providing a steep enough slope on the track cable for the return of the empty bucket to the pit by gravity.

Typical Machines—In the accompanying illustrations are shown typical

DOUBLE CRAWLER MOUNTING (at right) on tower-cableway machine. ROLLER AND SKID mounting (below, left) on dragline in New Orleans District.



WHEEL AND TRACK mounting (below, right) on big 150-ft. dragline near New Orleans.





DRAGLINES AND TRACTOR WAGON OUTFITS on Arkansas River levee contract of Sternberg Co., Inc.

tower-cableway machines. One, in the lower St. Francis basin near Hayti, Mo., under the direction of G. C. Little, construction supervisor, has a 700-ft. span and a head-tower raised from 70 to 97 ft. It is engaged in adding from 3 to 4 ft. to the height of an existing levee and enlarging the section in corresponding proportion. This machine is equipped with an 8-yd. open-bottom Sauerman bucket. Farther south, near Blytheville, Ark., is a 6-yd. unit with a 650-ft. cableway span and heightened head-tower, under the supervision of J. W. Haskins. Substitution of a 10-yd. Crescent bottomless bucket weighing 9500 lb. on this machine was tried out late last year, under the direction of Major E. C. Kelton, area engineer.

In the northern area of the Vicksburg district is illustrated one of the 6-yd., 560-ft. span tower machines with 70-ft. head-tower which E. S. Maupin, area engineer at Rosedale, Miss., is using on a "turnover" job—one in which material from an existing levee is excavated, moved inland and reused in the new and higher levee section, set back from the old line. A Bucyrus dragline assists in spreading surplus material on the land side.

In the Arkansas River area is another of the Government's tower-cableway machines in charge of G. A. Langhofer, general foreman. This machine handles the long-haul earth from the pit and is supplemented by a 125-ft. boom Bucyrus dragline which tops off and finishes the section.

Large Draglines—Dragline excavators on the river work range in size from the light 1 and 1½-yd. crawler-mounted machines with 45 to 60-ft. booms for levee slope trimming and wagon loading on haulage jobs up to machines with 150-ft. booms and 5 or 6-yd. buckets. In both small and large

sizes the dragline has won wide acceptance as a levee building machine. In all probability a greater yardage of earth fill for Mississippi levees is handled by draglines than by any other single type of equipment.

For draglines in the larger sizes (3 yd. and upward, with booms of 100 ft. or longer) power may be steam, Diesel engine, or Diesel-electric. Gasoline engine power is found generally on machines in the smaller size ranges. The newer large-capacity machines are powered with Diesel-electric plants and there is the possibility of taking electric current from commercial power

PAIR OF DRAGLINES (below) passing material on Sternberg contract. (In oval) WALKER STANSELL, contractor, W. L. LIPS-COMB, area engineer (Arkansas River), and GEORGE UZELL, contractor.



lines where they may be available near the work. Boom lengths range from about 100 ft. to a maximum of 150 ft. and bucket sizes from 3 to 6 yd.

Where the dragline can work in a borrow pit close enough to the levee to place the earth fill with a single cast it is an ideal machine for flood control work. This condition is encountered more frequently in the New Orleans district than in the Memphis and Vicksburg districts, due mainly to specifications which, for levees below the Red River, reduce the berm width to 20 ft., instead of 40 ft., and permit riverside borrow pit excavation at a slope of 1 on 10 instead of 1 on 50, as called for in the middle and upper delta districts. Under these favorable conditions of deeper borrow fairly close to the levee line much of the work in lower Louisiana is being done with long-boom draglines.

Draglines are prominent, too, in the other river districts, and are sometimes operated in tandem, one machine at the back of the pit feeding another close to the levee. Examples of this scheme of operation are to be found on the Boyce-Igo contract for a section of the Reelfoot levee in Kentucky and on the Arkansas River where the Sternberg Co., Inc., of St. Louis, under the direction of Walker Stansell, is completing some exceptionally high levee (30 ft. or more) with a pair of Monighan walking draglines, one a 72-ft. boom Diesel-operated unit with 2-yd. bucket and the other a Diesel-electric machine with a 125-ft. boom and 6-yd. bucket. For the U. S. Engineer Department W. L. Lipscomb, with head-

quarters at McGehee, Ark., is area engineer in charge of this work. It is a turnover job involving the placement of 10,000 cu.yd. of fill per 100-ft. station. The photograph on p. 59 gives a good idea of the huge size of this levee and the passing of material from one dragline to another.

The Sternberg organization, at another point on the Arkansas River line, is employing a combination of wagon haulage and dragline work. In addition to 7-yd. tractor-hauled Western and Euclid wagons loaded by a P&H 1½-yd. dragline, a Linn tractor with wheels on the front end and crawlers on the rear end, under a 5-yd. body, is in service on this job.

Dragline Mountings — Mountings for draglines on the Mississippi work

are of four general types: crawlers (usually on the lighter machines); skids and rollers; wheel trucks and railroad track; and walking tractions. The latter type is confined to the Monighan units and moves the machine 7-ft. at a "stride." Skid and wheel mountings, as illustrated herewith, are common on some of the big Bucyrus draglines in the New Orleans district, notably those of D. B. Hearin & Son, Grasser Construction Co., and Lewis-Chambers Construction Co., all working between New Orleans and Baton Rouge, under the direction of W. A. Wells, area engineer. The Lewis-Chambers machine, on wheel and track mounting is one of the largest-sized draglines on the river having a 150-ft. boom and 6-yd. bucket. It weighs 325 tons.

North of this contract C. I. Jones, contractor, of St. Louis, had just installed a 150-ft. boom Monighan dragline with 4-yd. bucket.

Much of the levee work north of New Orleans is a set-back operation, involving the use of material from the old levee a few hundred feet from the new line and in some cases an extensive relocation of roads and houses.

The district engineers in charge of the work above described are Lt.-Col. F. B. Wilby at Memphis, Major John C. H. Lee at Vicksburg, and Major W. H. Holcombe at New Orleans, all reporting to Brig.-Gen. Thomas H. Jackson, division engineer, under the general direction of Major-General Lytle Brown, Chief of Engineers.

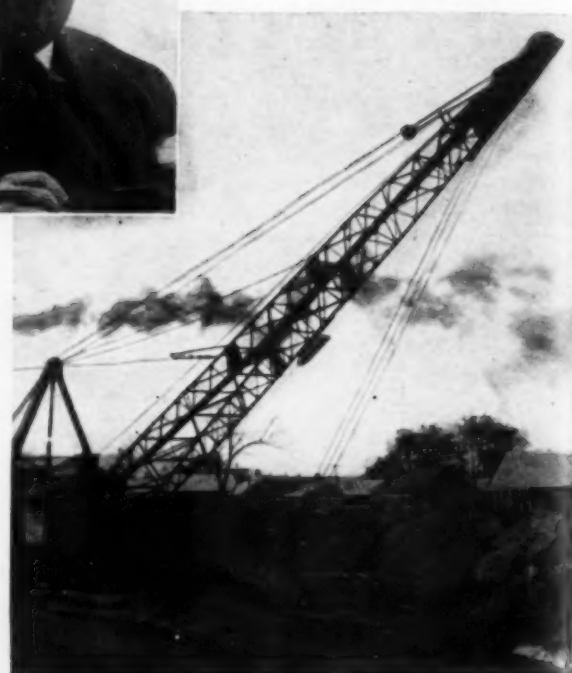
NEXT MONTH: Another article on Mississippi River flood control construction.



W. A. WELLS (in circle) area engineer, New Orleans. J. H. LEWIS (left) of Lewis - Chambers Construction Co., New Orleans. P. H. HEARIN (right) of D. B. Hearin & Son, Baton Rouge.



BIG DRAGLINE, with 150-ft. boom and 6-yd. bucket on Lewis-Chambers contract in New Orleans District.



DRAGLINE with 120-ft. boom and 3-yd. bucket building levee for D. B. Hearin & Son near New Orleans.

JOB ODDITIES

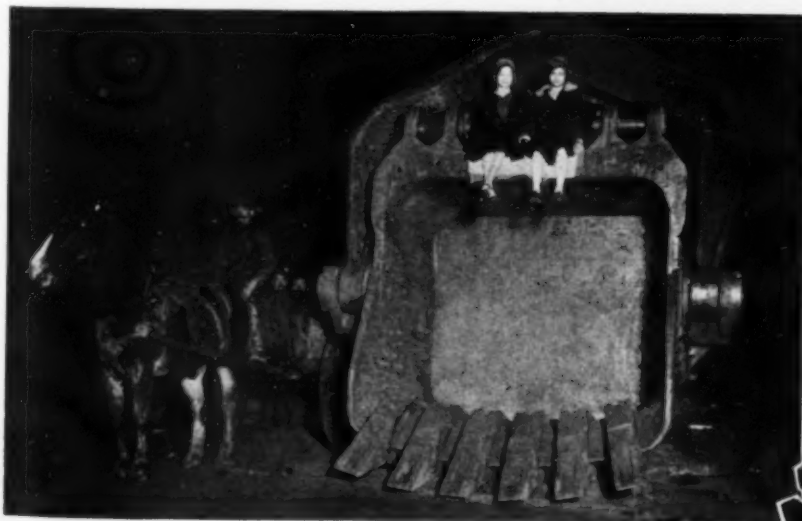
A Monthly Page of Unusual
Features of Construction



A GUIDE TO GASOLINE. Road-side filling station for motorists at New Bedford, Mass., rich in traditions of the sea, is replica of Government lighthouse nearby. Structure 54 ft. high, 30 ft. in diameter at base displays red beacon on main road between New Bedford, Fall River and Providence, R. I.



SINGLE TRAILER HANDLES BIG LOAD (*below*). For first time in history of New York subway construction a huge tunnel shield, 20 ft. 5 in. in diameter and weighing 160 tons, was jacked from bottom of 40-ft. shaft, loaded on to an eight-wheel Rogers goose-neck trailer and hauled as a unit, without dismantling, to a new site of operations under Prospect Park, Brooklyn, for the Cornell Contracting Corporation. Cradle of 12-in. timbers, held snug by cables around shield, supports huge load on trailer.



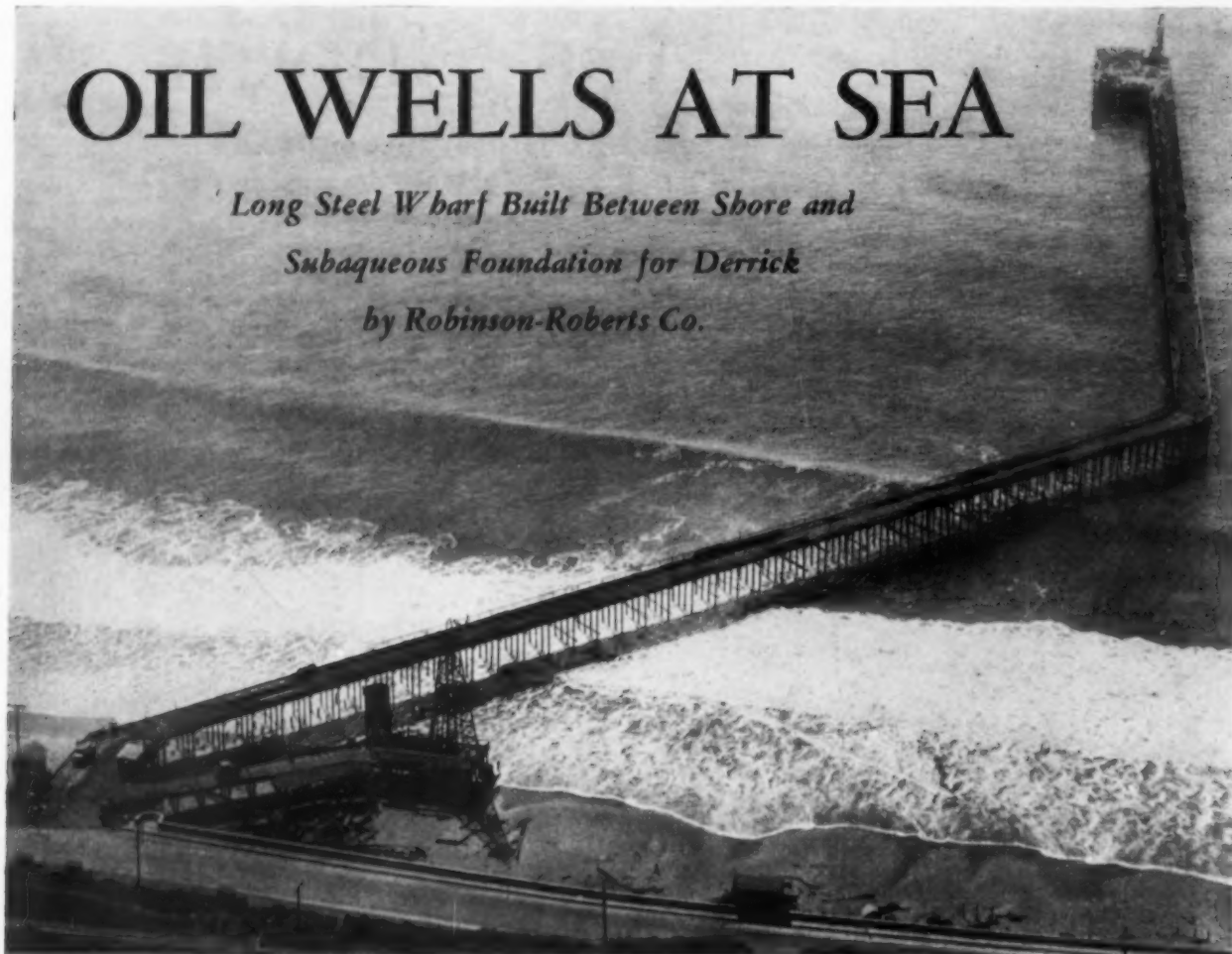
MAMMOTH DIPPER of manganese steel with 15-cu.yd. capacity was cast and assembled by the American Manganese Steel Co. for the Marion power shovel of the United Electric Coal Co. of Danville, Ill. Under the supervision of J. W. Fellmeth, operating engineer, the big excavator is used at the company's Duquoin, Ill., mine for stripping overburden from coal. It is 14 ft. high over the bail, 12 ft. wide between outsides of bail brackets and 14 ft. from ends of dipper teeth to the bottom of the door. It weighs 37 tons.



ALPINE CLIMBING TECHNIQUE is demanded of these workers who clean 500,000 panes of glass in London's Crystal Palace.

OIL WELLS AT SEA

*Long Steel Wharf Built Between Shore and
Subaqueous Foundation for Derrick
by Robinson-Roberts Co.*



TO PROVIDE access to oil-well drilling operations in the Pacific Ocean about 1800 ft. off shore from Seacliff, Calif., near Santa Barbara, the General Petroleum Co. last year awarded to the Robinson-Roberts Co., of Los Angeles, a contract for the construction of a long wharf of special design, comprising bents of H-column steel piling terminating at the seaward end in a submarine foundation of concrete-filled sheet pile cylinders to support the heavy weight of a 120-ft. oil derrick with its rigging and drilling equipment. The recent completion of the structure follows a protracted and bitterly fought legal battle involving rights to drill at sea and access to the work across a strip of beach between the water line and a state highway along the coast.

From the illustration at the top of this page it will be seen that there is an angle in the alignment of the wharf, due to the fact that this location offered the only available access from the state highway to the edge of the lease. Another condition that complicated construction was a state ruling that loaded trucks delivering material to the work could not park on the coast highway longer than 5 min. The wharf itself serves a dual function as a roadway to the oil derrick foundation at sea and also as a connection between the

STEEL PILING of H-columns carries wharf 1,800 ft. from shore to derrick foundation.



OIL DERRICK is 120 ft. high, supported by concrete-filled sheet pile cylinders.

first well and others that may be drilled nearer shore at some future date.

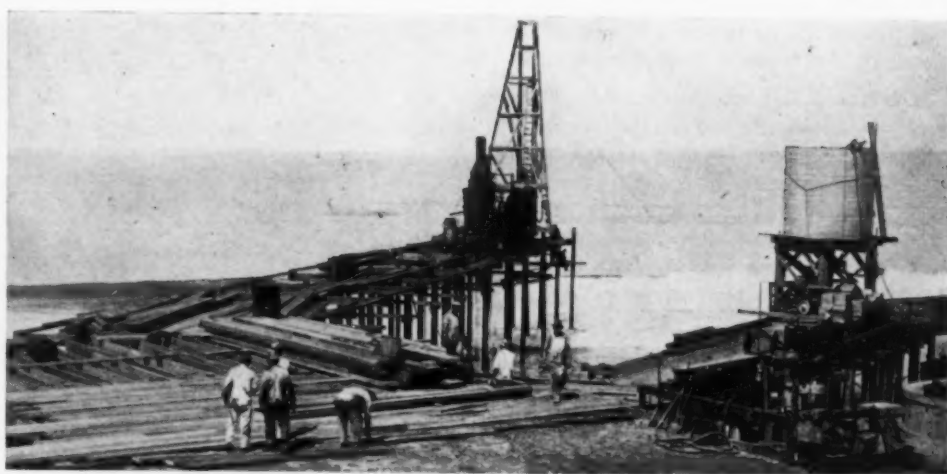
The derrick support and dock at the seaside end of the 1800-ft. wharf is a structure 77x200 ft. in plan. Four concrete-filled cylinders of Lackawanna arch web interlocking steel sheet piling, put down through water from 25 to 30 ft. deep, form piers for the legs of the big derrick. The dock is large enough to hold mud tanks, engines, pumps, well drilling supplies and accessory equipment.

H-Column Piles—Departure from previous standards of design is claimed for the Seacliff wharf. With wharves of other types damage is sometimes caused by flotation of the structure when pounding surf puts the sand around the piling into suspension, allowing a heavy ground swell to push upward from underneath the deck and lift the structure. To prevent this contingency and assure ample strength and deep penetration of the supporting piling into the shale bottom which underlies the sandy ocean floor it was decided to use as piles Bethlehem steel H-columns of two sizes, 8-in. on the shore end and 10 in. on the seaward end of the wharf.

Stiffening of the wharf structure is provided by cross-bracing of steel angles, electrically welded to the H-col-

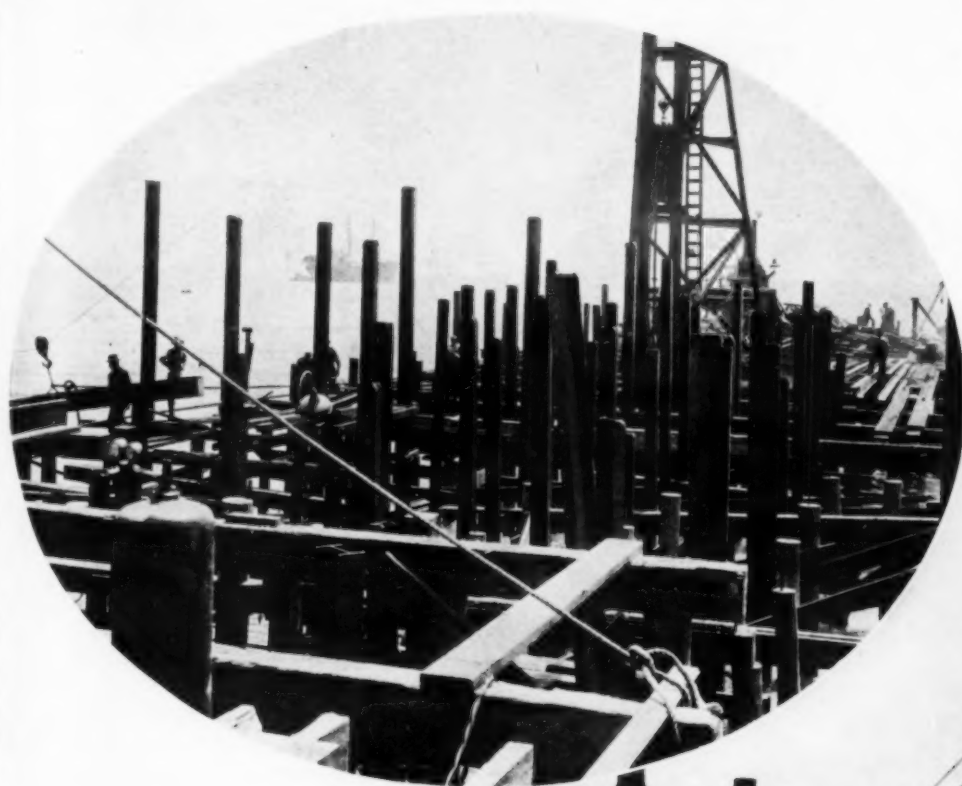


TRUCKS deliver material along beach.



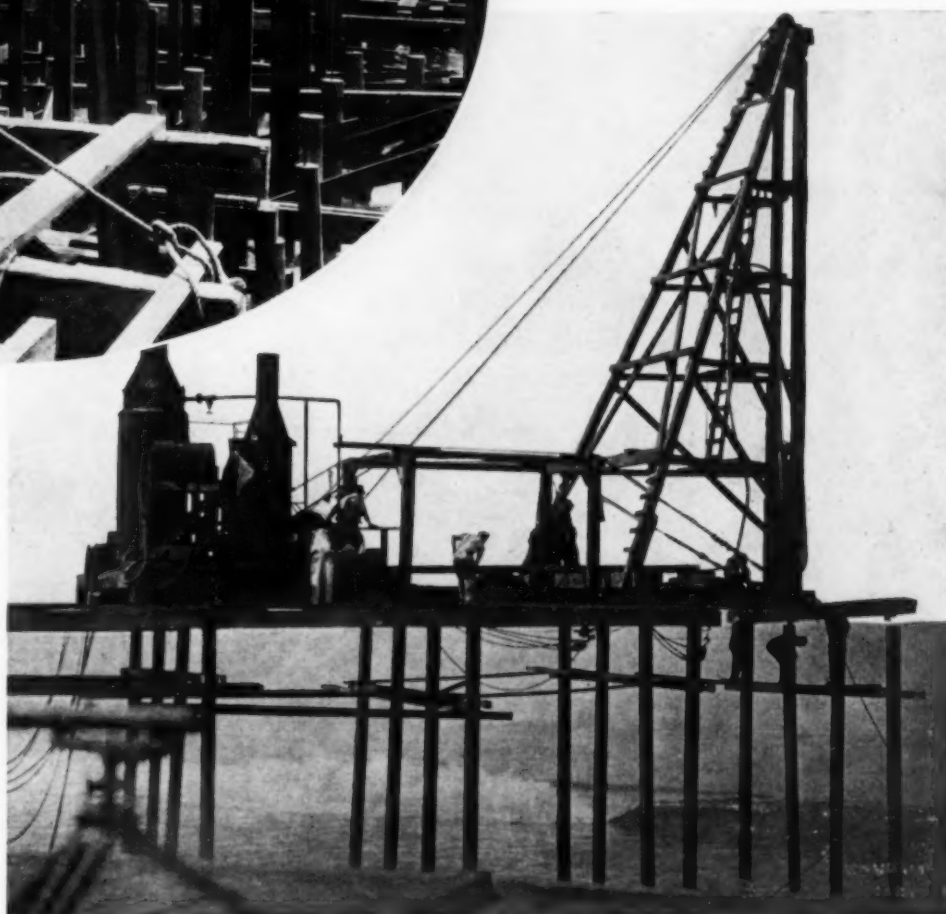
FALSEWORK PILING of wood was used to start the job. Later the driver operated from the permanent steel bents.

that permits the driving of steel against steel. At the inshore end of the wharf 32-ft. steel piles were used and at the outshore end 50-ft. piles. The piles, after penetrating into the shale bottom of the ocean, were cut off at the proper grade with an oxy-acetylene torch. The pile bents were capped immediately after they had been driven and stringers and decking were placed to form a working platform for the driver as it continued its progress seaward. On the average two bents of four piles each were driven in 8 hours, although



umn piles, and longitudinal X bracing of 1-in. steel rods between alternate pairs of bents which are spaced on 15½-ft. centers, except at the outer end, where a closer spacing obtains. In each bent there are four steel pile columns capped with 12x12-in. timbers bolted down to a steel plate welded to the pile top. Compound stringers of 12x16-in. timber, scarf-spliced over caps where possible, run the entire length of the wharf which is decked with 3x13-in. material. The roadway width is 22 ft.

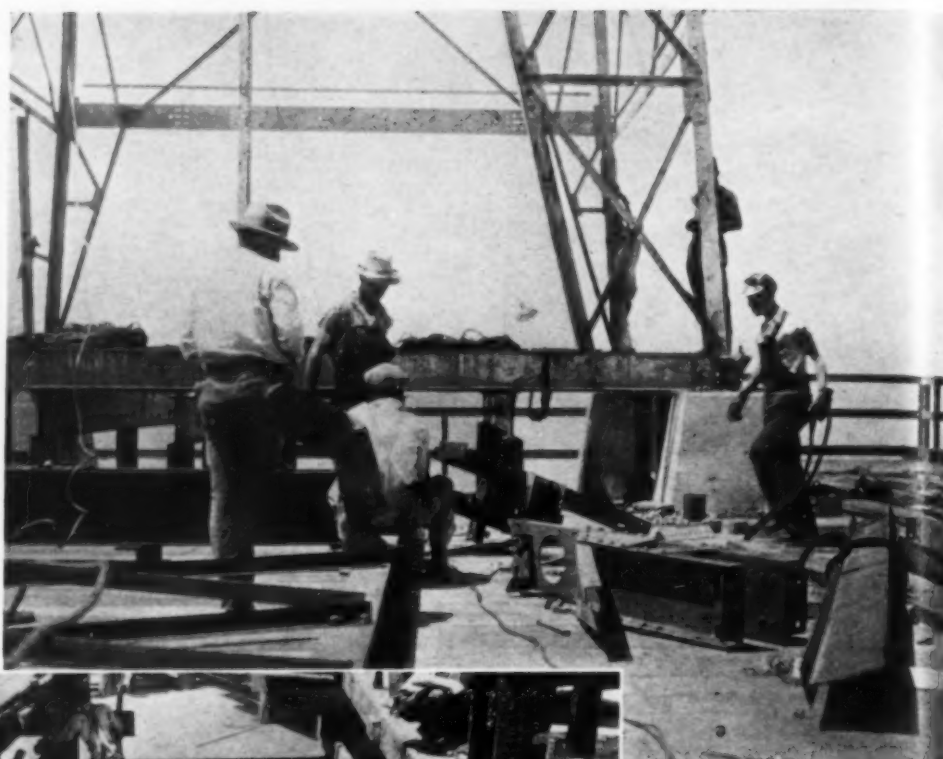
After falsework piling had first been driven for a short distance from shore to support the pile driving rig steel H-columns, cleaned of mill scale, primed and coated with Biturine enamel, were put down by a McKiernan-Terry hammer having a self-contained anvil block



PILEDRIVER worked seaward from end of wharf as bents were placed. STEEL H-COLUMNS (in oval) were cut off to proper grade by oxyacetylene torch.

sometimes it was possible to put down three or four bents in the same time.

Derrick Foundation—At the seaside end of the wharf the derrick foundation consists of four 8-ft. diameter sheet-pile cylinders filled with concrete, with a center well cylinder of larger size (14 ft. diameter) for the drill hole. To guide the driving of the Lackawanna arch-web steel sheet piling for these foundation cylinders a steel H-column was first driven at the center of the circle. To it were attached a pair of inner wooden guide rings about 12 ft. apart and an outer guide form held in place by driving from four to six piles. With the guides in place it was possible to drive the ring of interlocking piles to a true circle. After they had reached grade the steel cylinder thus formed was dredged with a small clamshell bucket, a cage of rail



CYLINDERS (right) of interlocking steel sheet piling, were driven, excavated and filled with concrete to form footings for legs of oil derrick and well for drill hole.



DERRICK FOUNDATION (below) comprised five cylinders, four 8 ft. in diameter for leg support and one 14 ft. in diameter for well drill hole.



ASSEMBLING DERRICK FRAME (above) of structural steel at end of 1,800-ft. wharf, where space is also provided around the drilling rig for installation of boilers, engines, pumps and other equipment. During drilling all weight is carried by the four leg foundations; when drilling stops weight is transferred to the center caisson cylinder.

reinforcement was lowered into place and concrete fill deposited, thus forming a footing for the support of the legs of the tall oil derrick.

An important feature of the central cylinder carrying the table from which actual drilling of the oil well is carried on is the installation of a cellar and a conductor pipe extending into the bed of the ocean, sealed to cut off inflows of salt water. In addition a scupper is required to prevent mud and oil from polluting the ocean water.

The time limit for the construction of the Seaciff wharf was 180 days but the Robinson-Roberts organization completed the job with two months to spare. The design of the structure was suggested by C. L. Roberts, member of the contracting firm. Construction was supervised by W. H. Richardson, engineer for the General Petroleum Co. A similar wharf was previously built by the same contractor at Elwood, Calif.

Present and Accounted For —

A Page of Personalities



W. J. WARD, foreman for the American Bridge Co., in charge of erection of Mid-Hudson bridge at Poughkeepsie, N. Y., described in *Construction Methods* last month.



JOHN H. BOLTON, of Bolton, Suits, Bolton & Gibbs, highway contractors of Watkins Glen, N. Y., newly elected president of the New York State Highway Chapter of the Associated General Contractors. Mr. Bolton is also town supervisor of Watkins Glen.



NEFF JENKINS, elected to the presidency of the Kentucky Association of Highway Contractors at that organization's recent annual meeting in Louisville.



G. A. BRYANT, JR., vice-president, Austin Co., Cleveland, who heads a group of that organization's engineers bound for Russia to construct a \$50,000,000 automobile factory and industrial city at Nizhni Novogorod.



BOUND FOR RUSSIA. Delegation from Austin Company who have left Cleveland to build huge industrial city and Ford automobile factory near Moscow. (Top row, left to right) T. B. Jorgensen, H. F. Miter, W. J. Austin, G. A. Bryant, Jr., F. J. Moxness, D. H. Kempler, K. Von Havermaet, R. G. Farrington, P. K. Davis and E. T. Smith. (Center row) A. J. Marsh, R. C. Vore, H. C. Patterson, Allan S. Austin, C. F. Appleton, A. F. Surre and W. Baggaley. (Bottom row) Mrs. Havermaet, Mrs. Patterson, Mrs. Allan S. Austin, Mrs. Vore and Mrs. Baggaley.

NEW EQUIPMENT ON THE JOB

New Tongs Make Pipe Line Work Easier

To make flat pipe and pipe line work easier, the J. H. Williams Co. of Buffalo, N. Y., has designed what it calls the Vulcan Boll-Weevil tongs, the operation of which is said to save a great deal of time and effort.

When the tongs are laid on top of the pipe and the chain hooked around it, the proper adjustment for

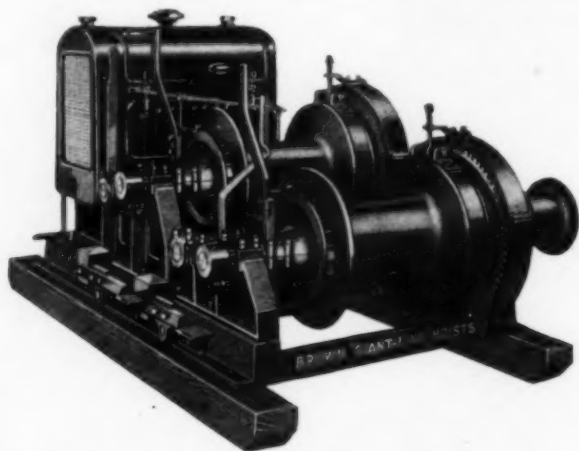


"making up" or "breaking out" is made without difficulty. For "making up" the tongs are slid forward so that the rear end of the jaws engages the pipe and the handle is pushed down. For "breaking out" the tongs are pulled back to engage the forward teeth with the pipe and the handle is pulled up. The arc of the jaws and the shape of the teeth give positive bite. Jaws are reversible for double life. When the teeth first in use wear, the jaws are turned end for end.

The tongs may be had in sizes for $\frac{3}{4}$ - to 12-in. pipe.

Rounds Out Its Line of Hoists

To round out its line of hoists ranging from 4 to 60 hp. in size, the Brown Clutch Co., of Sandusky, Ohio, has developed the Model 30 series in 1- 2- and 3-drum types, including boom swinger. These hoists are powered by



24, 28- and 32-hp. Hercules motors. The bronze screw thrust and positive clutch release are standard features of these hoists.

Hand Hoist for Truck Bodies

For truck bodies up to 2 tons capacity the Rock Manufacturing Co. of Waterloo, N. Y., has placed on the



market a hand hoist which will dump a load in one minute.

The lifting mechanism consists of upper and lower pairs of lifting arms, the forward ends of which are attached to the body and chassis respectively. These arms are hinged together to form a toggle. Between them, at the front end, is interposed a shaft carrying rollers, which is forced back by the action of the winch to separate them. Practically any tipping angle may be obtained by varying the location of the hoist with respect to the body hinge at the rear.

The hoist is mounted under the body of the truck and requires but 11 in. of space between the body floor and the truck frame. When the body is down, it rests on the side rails of the

truck frame in the usual manner. In this position, the body is locked securely by a strong latch which engages a lug on the winch drum and prevents rattling on the road. It is stated that no drilling is required to attach the hoist to the truck.

Improved Rear-Type Crawlers

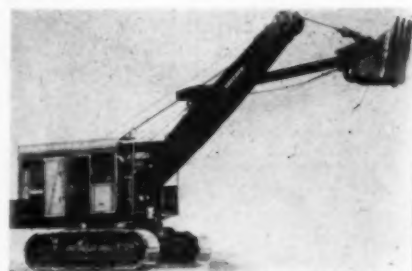
Improvements and refinements on its model "TG" rear-type crawlers for use on McCormick-Deering 10-20



industrial tractors have just been announced by the W. A. Riddell Co. of Bucyrus, Ohio. These new crawlers are particularly valuable for use with power graders and bulldozers where it is necessary that a tractor be maintained on an even keel or where a cutting blade is required to cut to close limits.

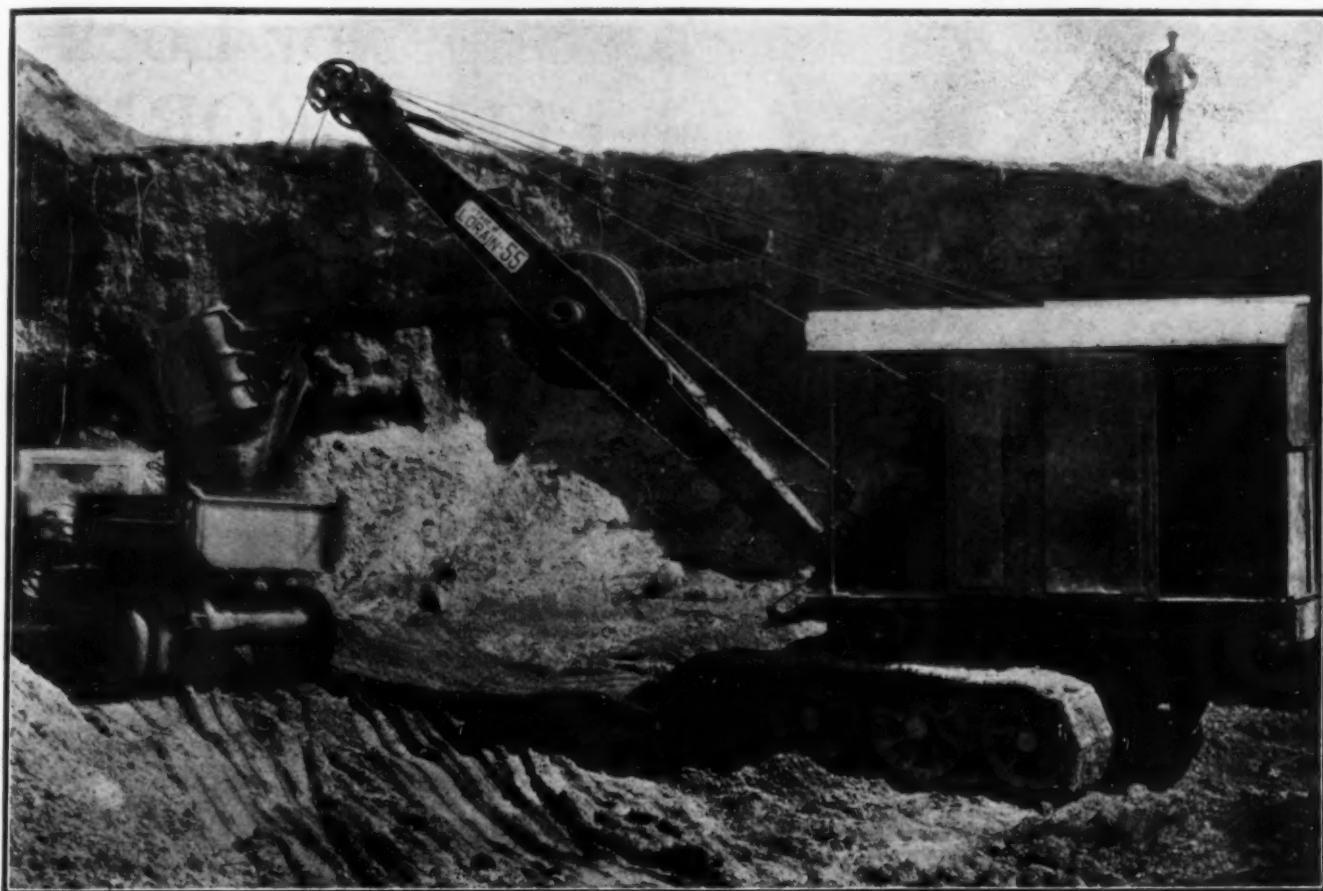
A Recent Shovel Product

A recent product of the Speeder Machinery Corporation of Cedar Rapids, Iowa, is the Model 90 shovel



of 14-yd. capacity. Like other Speeder shovels the new model has two working speeds on all operations, drums, travel and swing. The high speed is for shovel work; the medium speed for crane or dragline work. Other features are an automatic swing and travel brake, back-gear and purely automatic, which engages as soon as the clutches are released, thus eliminating the burning of reverse clutches, and an automatic power trip for the bucket which can be released by the pressure of a finger tip. The treads are of extra length, 14 ft. 6 in. over all. Gasoline, diesel or electric motors are offered as standard power equipment for this shovel.

1 yd. LORAIN 55



A 1 yd. excavating and material handling machine built to the greatest specification a shovel or crane can have—Thew Center Drive.

- A shovel that digs deeper below the treads, dumps higher and farther out than any other shovel of equal length boom and dipper stick.

- A crane that simultaneously hoists, swings, travels with independent control of each operation.



- Mounted on 2 Speed Center Drive Crawler, famous because of low maintenance cost.— Easily extended to longer "64" and "68" tread crawlers with lower ground pressures for crane, clamshell or dragline service.

- Interchangeable to crane, clamshell, dragline, backdigger, skimmer scoop operation.



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Lorain, Ohio

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*Meet New Road
Specifications*



HELTZEL BULK CEMENT BATCHING PLANT

The most economical way of handling cement. Write for full details.

We also manufacture steel forms for streets, curb, sidewalk, curb and gutter, manholes, concrete pipe, steel bins, street joint, measuring hoppers, volume and weighing type, bridges, bulkheads, sub-grade testers, trail graders, mortar boxes, etc.

A HUSKY road form which permits the use of the most modern road building equipment. A rigid form featuring a positive, tight locking joint and perfect alignment.

Steel stakes, 1 inch in diameter and specially hardened, are held firmly in position by the use of wedges. The stake pockets are so designed that concrete does not clog them.

This form insures a smooth surface, easily negotiates curves and grades. Want further details? Send coupon for literature.

The HELTZEL STEEL FORM & IRON CO., WARREN, OHIO

Please send me advance information on Heltzel Superior Lock Road Forms. Send your fully descriptive folder to the address given.

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Company
Address

C.M. 5-30



READY MIXED CONCRETE CORP., RICHMOND, VA., IS CHANGING OVER ALL ITS TRUCKS TO GOODYEARS

ISN'T THIS WHAT YOU WANT TO KNOW ABOUT HAULING BUILDING MATERIALS?

You want to know what tires will do the best job for you — what tires will deliver the lowest cost year after year.

Certainly one of the best ways to find out the best tire for you, is to look at the experience of others.

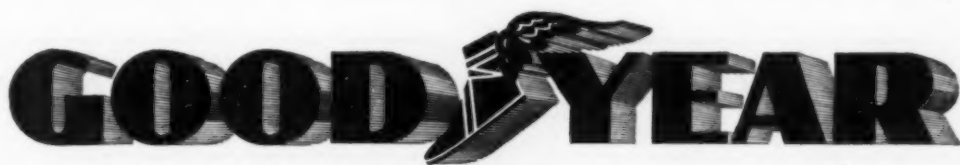
You'll find that more trucks are equipped with Goodyear Tires—*more tons are hauled on Goodyear Tires than on any other kind.* Isn't

that a strong proof that your fleet should be on Goodyears, too?

For hauling building materials, Goodyear builds a special Dump Truck Pneumatic. It's a brute of a tire — extra broad of tread for pulling out of soft ground around excavations — with heavy rubber bars on its sidewalls for extra traction and protection from sidewall gouging. On slower trucks,

many use the Goodyear Super Heavy Duty Cushion—and trucks that want to make extra speed on the open road are now adopting the new Goodyear Truck Balloons.

Ask a Goodyear Truck Tire Service Station Dealer to analyze your hauling needs. You can depend on his recommendation for the right tires to use on your fleet.



MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND

HAZARD

WIRE ROPE

SELECTIVITY

—the Key to Lower
Rope Costs

There's a Hazard Rope
for every class of service
FLEX-SET Preformed Wire Rope
Armored Wire Rope
Improved Flattened Strand
Bear Cat Rope
—and all standard constructions

THERE is a distinct advantage for you in buying wire rope from the company that makes a complete line. This advantage is the ability to obtain *properly designed rope* for each particular operation.

Take drag line service, for example. You need rope especially designed to withstand severe abrasion—such as Flattened Strand. Or for operations where multiple reeving is encountered, you should use Preformed rope, designed to resist severe bending strains. And for dredging, Armored rope is designed to resist corrosion of the inner wires.

Selection of the *properly designed rope* for each operation is the key to lower rope costs.

From the complete Hazard line, rope buyers can obtain—and are certain to receive—the rope most suitable, and most economical, for each class of service.



HAZARD WIRE
WILKES-BARRE



ROPE COMPANY
PENNSYLVANIA

New York

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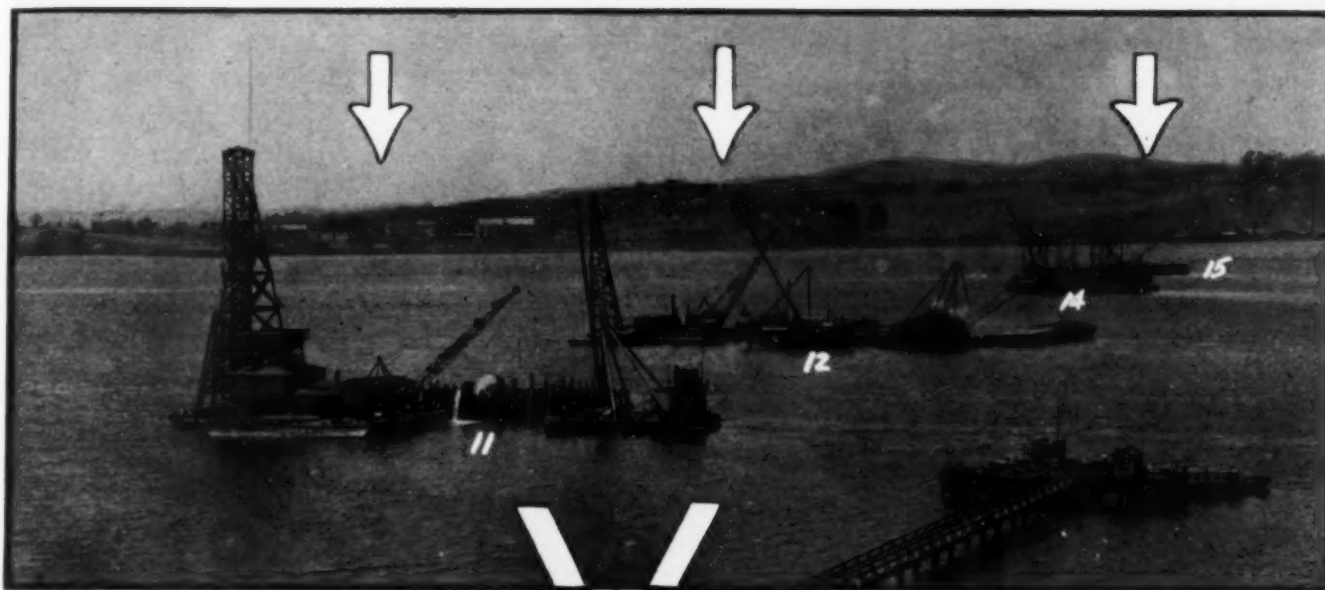
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Denver

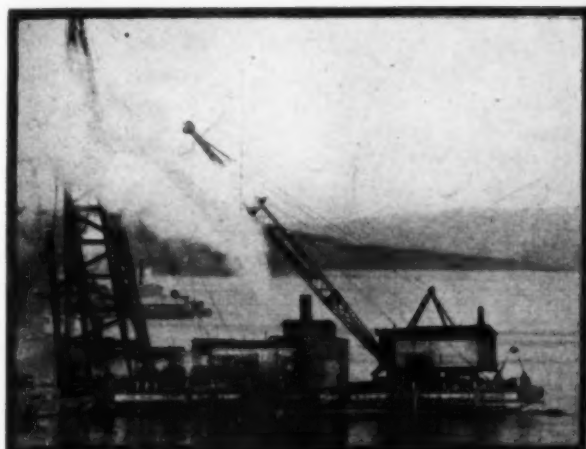
Los Angeles

San Francisco

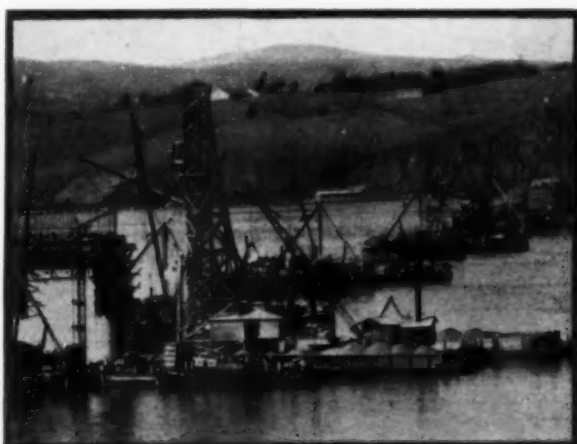
Birmingham



WITH A CONCRETE PLANT



SETTING AND PULLING PILES



A Travelling, Revolving, Long Reach, Heavy Duty Steel Derrick.

VERSATILITY PUT "WHIRLEYS" ON THE SUISIN BAY BRIDGE JOB

Siems, Helmers and Schaffner, Inc., St. Paul, are putting the bulk of the materials handling on the Suisin Bay job up to three Wiley Whirleys.

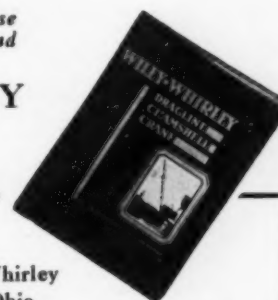
Their wide usefulness, adaptation to any mounting and great capacity at long radius, with full circle swing—the same factors that have made them so profitable on other bridge work—made them the choice on this job. One "Whirley" is on a barge with a concrete plant—another on a barge with a pile driver—the third on a barge by itself.

Since 1919 we have been building, exclusively, Wiley Whirleys for clamshell, dragline, crane or derrick work, with 60 to 100 ft. booms. These money making machines have proved all our claims for their strength, simplicity, speed and reliability—for continuous operation with little or no repair expense.

The "Whirley" catalog describes these versatile machines in detail—let us send you a copy.

**The DAYTON-WHIRLEY
COMPANY**

Dayton, Ohio



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Co., Dayton, Ohio
Send the Wiley Whirley Catalog. Where
can we see a "Whirley" on the job?

Whatever the job...

AIR-KINGS

*do
it
better!*



110 cu.ft. M-W "AIR KING" furnishing air power for a small tool used in finishing a statue in Chicago.

Air power—whether used by the sculptor for carving intricate designs, or used by the workman on a ditch digging job—is certain and dependable when supplied by the powerful "AIR KING".

Actual usage and performance records of AIR KING PORTABLE COMPRESSORS from hundreds of owners are conclusive evidence of their incomparable quality of design and construction—and their faithful dependability under all operating conditions.

M-W AIR KING Portables are second to no compressors in the

world. Write for special information. It will pay you to know the facts.

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AIR KINGS—embodying such exclusive features as Heavy Duty Industrial Engines with 25% reserve power, "Feather" Valves, Forced Feed Lubrication, All-Welded Steel Frame—are made in 28, 110, 220, 280 and 330 cu. ft. sizes—on Towabout, Tractor and Railcar mountings.

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PORTABLE AIR COMPRESSORS



A NEW service

IN line with the type of service that our many old friends in the road building field have learned to rely on through seventy-two years of satisfactory dealings—we now announce a National Austin-Western Service.

That the users of Austin-Western Road Machinery may never be inconvenienced, an expert service man with no other responsibility and who is a member of the Austin-Western organization, is now stationed at each of the company's branch offices in principal cities throughout the country. Complete stocks of repair parts

are also available at all branches. Regardless of where Austin-Western machines are in operation, there is now a responsible repair man with necessary parts within reasonable distance.

No longer need contractors or road programs suffer costly and needless delays waiting for some vital part to be repaired or replaced.

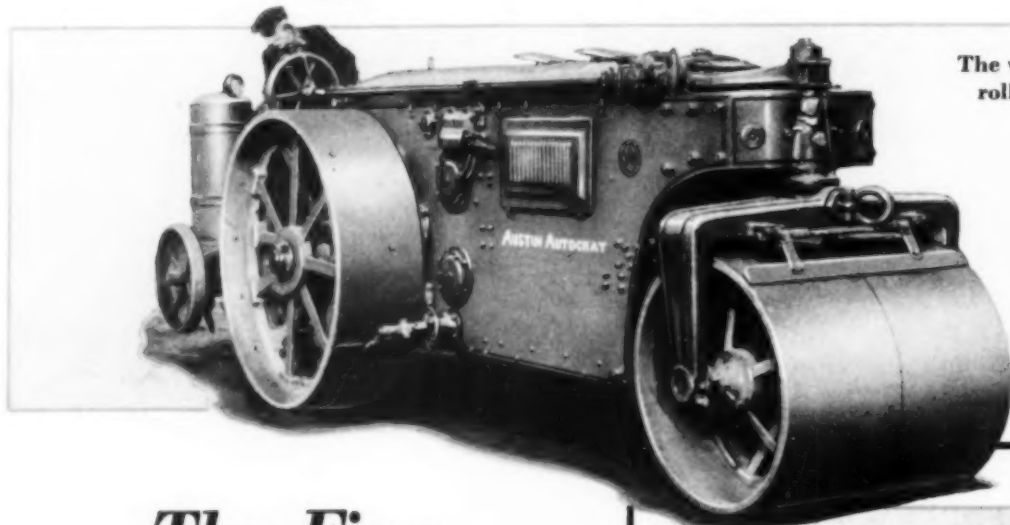
This service is just another step in the Austin-Western program for generally improving every road operation and making it cost less—thereby releasing funds for additional operations.

Austin-Western ROAD MACHINERY

AUSTIN-WESTERN ROAD MACHINERY—COAST TO COAST



"The **BEST** rollers
that skill and experience
could produce!"



The world's finest
roller at work

The Fine Austin Autocrat

NO effort has been spared to make the Autocrat the finest roller in the world. Just to list a few of the outstanding features of this peer amongst road rollers is to suggest a quality and performance never before attained in any roller.

Take for example:

The Duplex Worm Gear Drive in the Autocrat gives the greatest efficiency in the transmission of power ever attained in a roller.

The Heavy Three-Speed Transmission permits the use of massive gears with extra large wearing surfaces that will give years of service.

Two Fourteen-Inch Twin-Disc Clutches, forward and reverse, give positive control and ability to reverse direction without changing gears or releasing a master clutch.

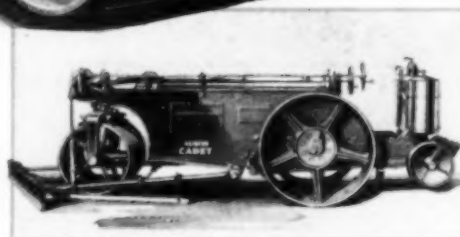
A Streamline Frame of Great Strength and Rigidity gives ample support to the massive parts of transmission and motor assemblies.

An Electric Starting System with generator and storage battery.

A Pneumatic Scarifier with Air Compressor Release to throw the compressor out of operation without trouble or loss of time.

Two Reliable Brakes, a foot service brake and a hand emergency brake.

Stored Electricity for parking or headlights.



AND THE EQUALLY FINE Austin Cadet!

The Cadet is the Autocrat of all pup-sized rollers. Patterned after the famous Austin Autocrat, the Cadet is a completely factory built, 4-cylinder model, making possible three speeds forward and reverse. It is made in 5, 6 and 7-ton sizes, all of which can be fitted with the patented Austin front planing blade and pneumatic scarifier. A short wheel base—only 8' 11 3/4"—provides ease of operation between forms for concrete roads.

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Leaning Wheel Graders, Straight Wheel Graders, Motor Graders, Elevating Graders, Crawler Dump Wagons, Scarifiers, Rock Crushers, Portable Conveyors, Rollers, Motor Sweepers, Street Sweepers, Sprinklers, Road Oilers, Hot Patch Portable Asphalt Plants, Plows and Scrapers.

RIBBED STEELTEX lath for plaster

GIVES THESE 10 RESULTS ~

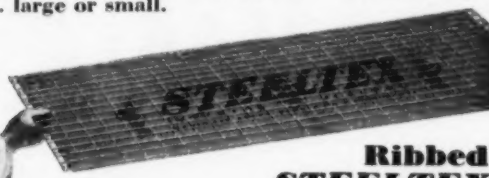
★ MERIT CHART	Ribbed STEELTEX for Plaster
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Insulation	✓
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Automatic back-plastering	✓
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Added security over suction or plaster keys	✓
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Prevents lath marks from showing on finished plaster	✓
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Ribbed STEELTEX, the modern plaster lath and steel reinforcement, protects the beauty, value and permanence of plaster walls and ceilings . . . and safeguards your investment.



Use Ribbed STEELTEX lath for plaster walls and ceilings and you will get all ten results as shown in the merit chart (at left).

Any plaster lath will give some of these results, but to obtain a first-class plastering job, all ten results, as indicated in the chart, are of vital importance. Ribbed STEELTEX lath gives all ten results. Previously limited to costlier dwellings only, Ribbed STEELTEX is now suitable, practical and economical for every type of home or building . . . large or small.



Ribbed STEELTEX is more . . . does more than ordinary lath

Ribbed STEELTEX for interior plaster is the easiest handled lath on the market and comes in bundles ready for application. Ribbed STEELTEX lath is quickly and easily applied and when plastered becomes a one-piece, solid reinforced plaster slab . . . like reinforced concrete in principle.

The reinforcement of Ribbed STEELTEX is composed of a network of cold-drawn, electrically-welded steel wire (heavily galvanized). This steel network is securely woven onto a tough, pure-fibrous backing. Across the back of the STEELTEX sheet are rows of v-shaped metal rib stiffeners . . . insuring board-like rigidity. Ribbed STEELTEX provides all the modern requirements of a highly satisfactory plaster lath and steel reinforcement. There are other interesting details about Ribbed STEELTEX . . . sign the coupon below and get the facts.



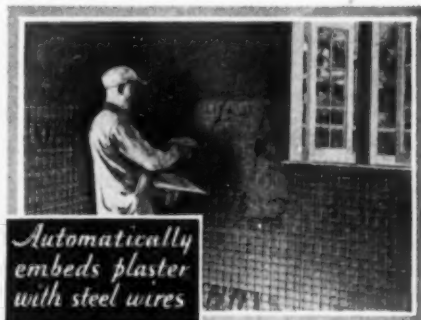
Cuts easily to fit window and door openings

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Every room blanketed with heavy backing of STEELTEX . . . insulates against heat & cold, deadens sound

Application of Ribbed STEELTEX is rapid



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Pittsburgh Steel Co.

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Gentlemen:—Please send (free) descriptive STEELTEX literature, for interior plaster ☐ for stucco ☐ for brick and stone veneer ☐ for floors ☐ for roofs ☐.

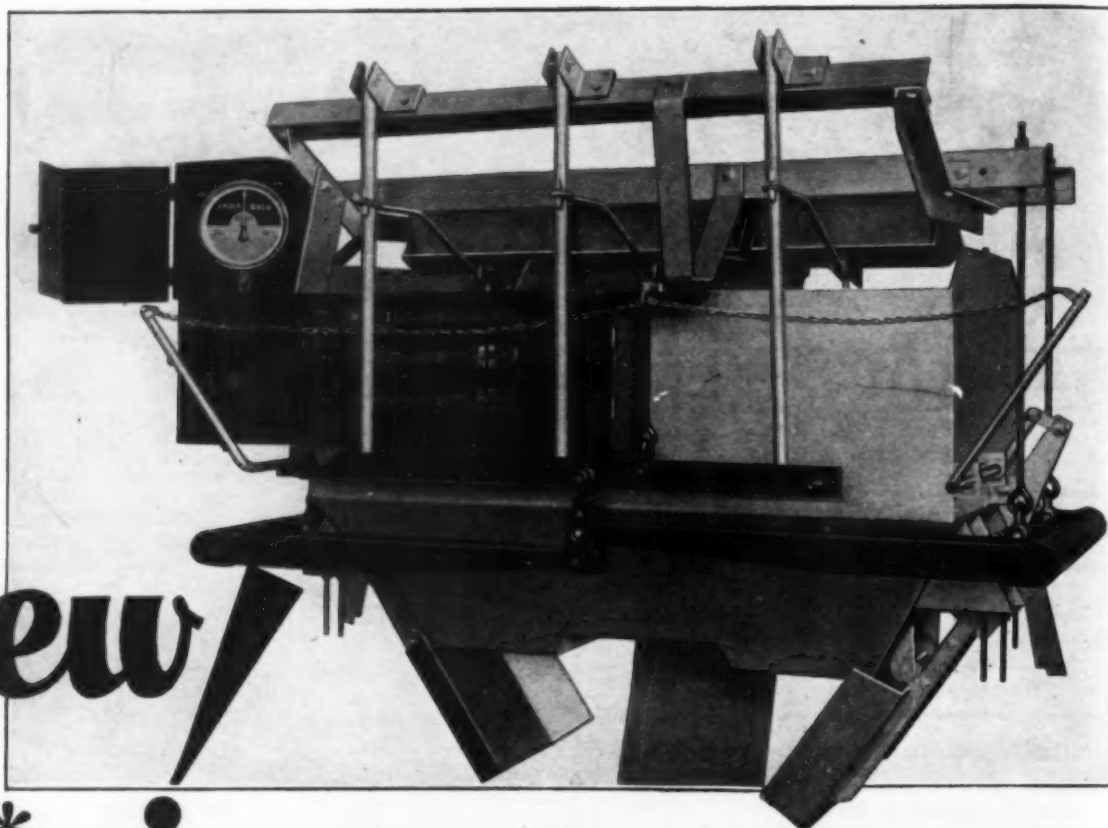
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* A 3 BEAM, 3 COMPARTMENT BUTLER WEIGHING HOPPER

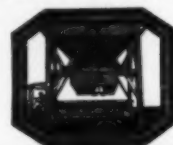
A NEW 3-beam scale that meets the most rigid requirements of the toughest job where speed and easy, dependable operation are important.

This new Weighing Hopper is designed to meet the new specifications of the Joint Committee of the American Association of State Highway officials and the Good Roads Association. This makes it eligible for all state and county work.

It is a marvel of compact, simplified equipment that is easily operated under all conditions. Be sure to get full information on this new Butler product before deciding on new weighing equipment.

**This scale can be furnished in the 2-beam type where conditions do not require the use of the 3-beam type.*

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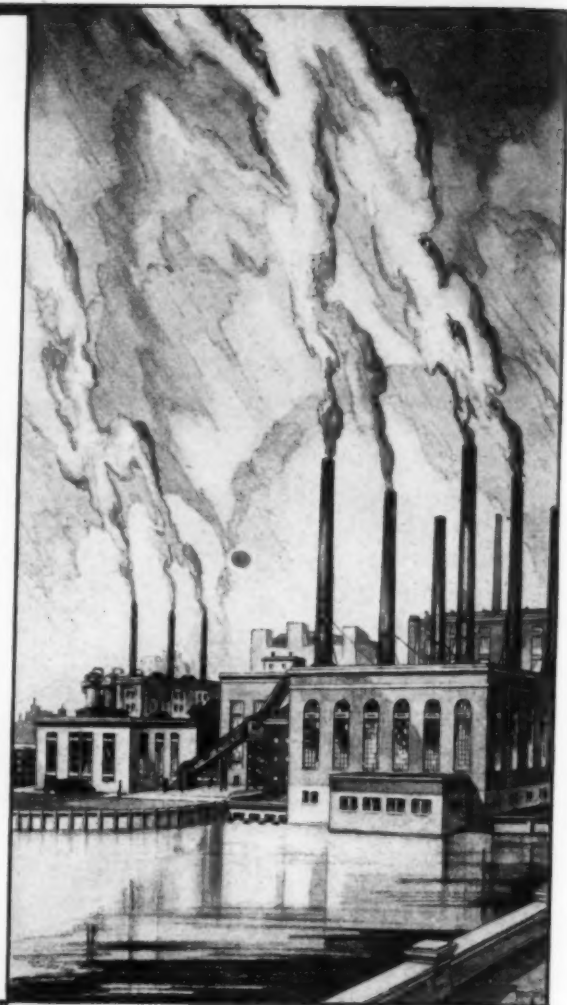
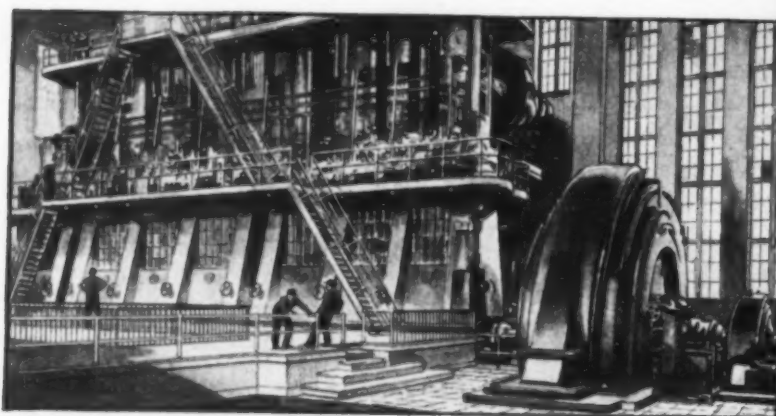
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Map shows
location of
Concrete
Steel
Company's
Warehouses

Camden, N.J.,
Warehouse,
Concrete
Steel Co.

FOR a quarter of a century, the Concrete Steel Company has served the construction industry. Today it maintains well-stocked, perfectly-equipped warehouses at strategic points throughout the country. At these depots all reinforcing material is cut, bent and fabricated to specification. It then is delivered to the job on a pre-determined schedule day by day to suit your requirements.

Such is the **SERVICE** that Concrete Steel Company is in a position to render you in supplying reinforcing material. Let us figure on the specifications for your next job.



Executive Offices:
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DISTRICT OFFICES —
Birmingham, Boston,
Chicago, Detroit,
Milwaukee, Minne-
apolis, Philadelphia,
Pittsburgh, St. Paul,
Syracuse, Washington.

Concrete Steel Co.

FIVE GREAT TRACTORS



-that span the full range of your working needs!

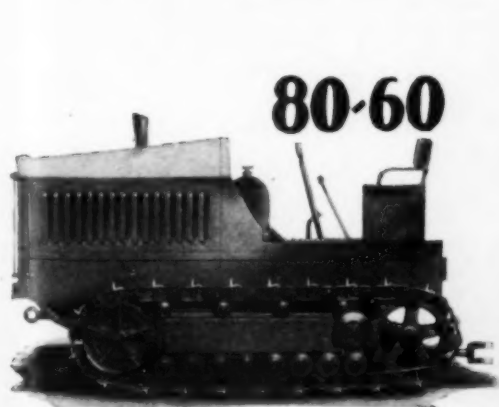
HERE is power — cheap, dependable, profitable — to match your small jobs or your very biggest. Whether it's building new highways or maintaining old ones — excavating for a reservoir, filling in a lake front or laying out a suburb — the Cletrac line provides a choice of power units to economically meet all operating needs.

Back of these modern Cletracs is fifteen years of exclusive manufacture of "crawler type" tractors. Built into them are the many advancements and refinements that only *specialized* manufacture can develop.

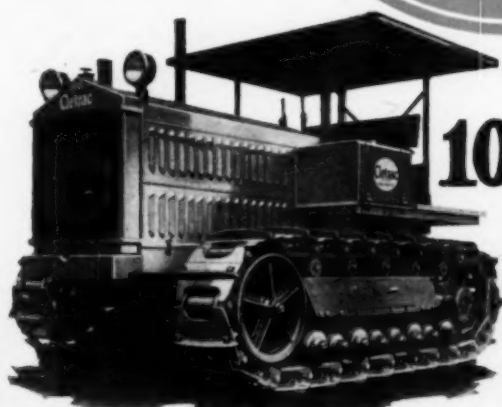
Investigate these tractors — their records for speed, capacity, endurance — their unmatched economy of operation. Let us place the full story before you — or arrange with your local Cletrac distributor for demonstration.

THE CLEVELAND TRACTOR COMPANY

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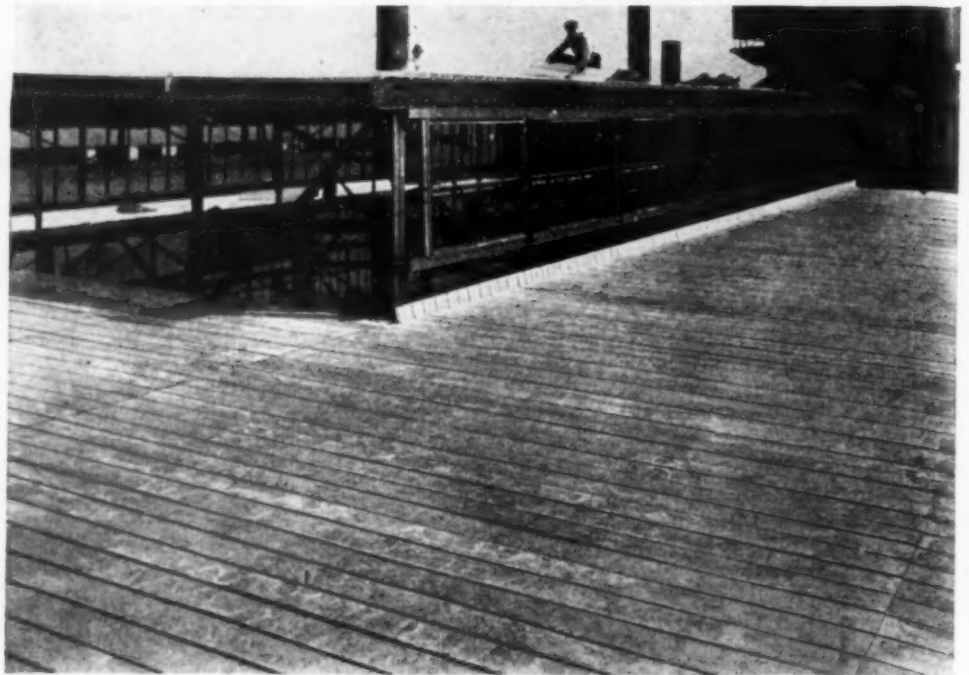
Listed here are a few outstanding Mahon Steel Roof Deck installations.

American Brass Co.
American Coil Spring Co.
American Gear Mfg. Co.
Apollo Steel Co.
Armstrong Cork Co.
Arvey Corporation
Bohn Aluminum and Brass
Briggs Manufacturing Co.
Brunawick, Balke, Collender Co.
Buick Motor Car Co.
Cadillac Motor Car Co.
Campbell, Wyant & Cannon Co.
Columbus Union Oil Cloth Co.
Continental Steel Co.
Detroit Edison Co.
Durant Motor Car Co.
Eastman Kodak Co.
Fisher Body Corporation
Fosteria Glass Co.
Frigidaire
Gemmer Mfg. Co.
General Railway Signal Co.
Glasscock Mfg. Co.
Hupp Motor Car Corp.
Ingersoll Rand Co.
Larkey Foundry Co.
Latrobe Electric Steel Co.
Liquid Carbonic Co.
Nichols Copper Co.
Oakbrook Hosiery Mills Inc.
Oakland Motor Car Co.
Olds Motor Car Co.
Packard Motor Co.
Pennsylvania Light & Power Co.
Pennsylvania Railroad
Robert Buyer Corporation
Rossman Corporation
Timken Roller Bearing Co.
U. S. Navy
Warner Aircraft Corporation
Wilcox Rich Company
L. A. Young Industries

Below is a cross section of Mahon Steel Roof Deck showing application of insulation and roofing material.



Mahon Steel Roof Deck, manufactured from special tight coated galvanized copper bearing steel, requires no painting or maintenance whatsoever . . . it provides a smooth rigid surface for the application of insulation and roofing material.



Mahon Steel Roof Deck installed on a new plant for the Latrobe Electric Steel Company, Latrobe, Pa.

THE broad acceptance of Mahon Steel Roof Deck among the outstanding industrials of the country is significant of two things: First, that Mahon Steel Roof Deck is thoroughly practical in every respect . . . and that the ease of installation, and the principle of load distribution through lateral continuity, has gained for it a decided preference among architects and builders; Second, that architects, builders and manufacturers are availing themselves of the economies and the firesafety and permanence provided by this modern type of roof. Mahon Steel Roof Deck is less than

half the weight of the lightest roof in other types of permanent, firesafe construction. It is rolled from special tight coated galvanized copper bearing steel . . . it will not disintegrate, and it requires no painting or maintenance whatsoever. In buildings designed to carry this extremely light roof load, savings amounting to as much as 25% can be effected in the supporting steel alone. Let us show you the economies and the structural advantages of Mahon Steel Roof Deck. Write for our complete data book and our folder, "Facts and Figures."

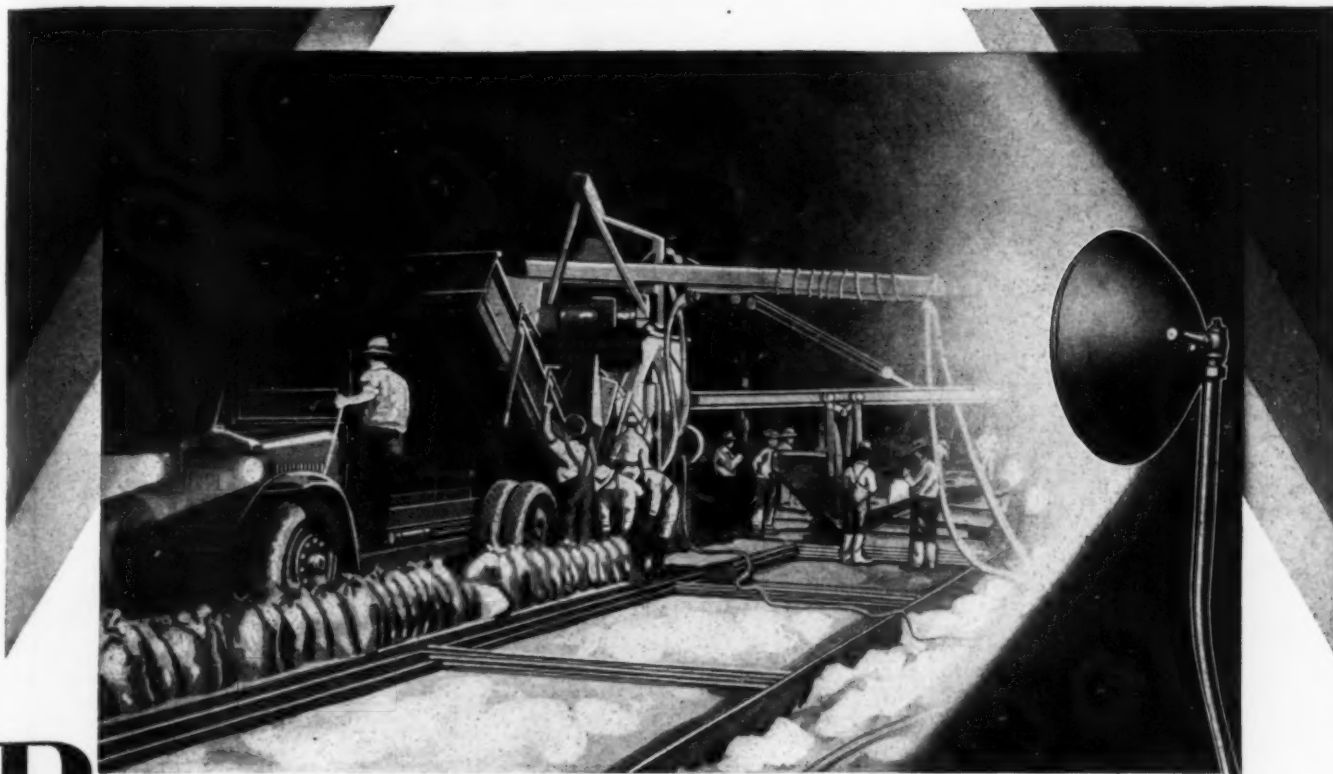
THE R. C. MAHON COMPANY
DETROIT, MICHIGAN

Representatives in Principal Cities

MAHON
STEEL ROOF DECK



Manufactured in Galvanized Copper Bearing Steel in either 18 or 20 Gauge



PRESSED FOR TIME?

When you lose valuable time because of breakdowns, adverse weather conditions, or other emergencies—

Put Carbic Flood Lights to work!

Bring your work up to schedule—and keep it there. Any time is working time for the contractor equipped with Carbic Flood Lights.

Carbic Flood Lights afford ideal illumination for night work. Their powerful rays enable your men to work rapidly and safely at night. There is no glare, and no dark shadow. Penetrates fog, smoke or dust to a remarkable degree.

The initial cost of the Carbic Flood Lights is low, and the operating expense is negligible.

Carbic is distributed by the Union Carbide Sales Company through its national chain of warehouses and is sold by jobbers everywhere.



OXWELD ACETYLENE COMPANY

Unit of Union Carbide **UCC** and Carbon Corporation
NEW YORK

Sales offices in principal cities

Technical Publicity Dept., CM-5-30 12th floor
205 East 42nd Street, New York, N. Y.

Without obligation, I would like to have additional information on Carbic Lights.

Name.....

Street Address.....

City..... State.....



USED ON THE PIERS OF NEW HUDSON RIVER BRIDGE AT 176TH ST., NEW YORK CITY.



IN USE ON NEW SUBWAY CONSTRUCTION IN NEW YORK CITY.



USED EVERYWHERE FOR PUMPS.

Wherever Nuts Are Turned Time and Money Can Be Saved

By Using
THE
FAVORITE Reversible Ratchet **WRENCH**

It works with the quick, straight ahead ratchet movement, and wrench head does not leave the nut until operation is completed.

Compare this with the time wasted by the old fashioned open end wrench that has to be removed from the nut at every part turn for a fresh hold—unnecessary lost motion.

Has the socket form of head that encompasses the nut on all sides with equal pressure. This tends to prevent wrench from slipping off nut.

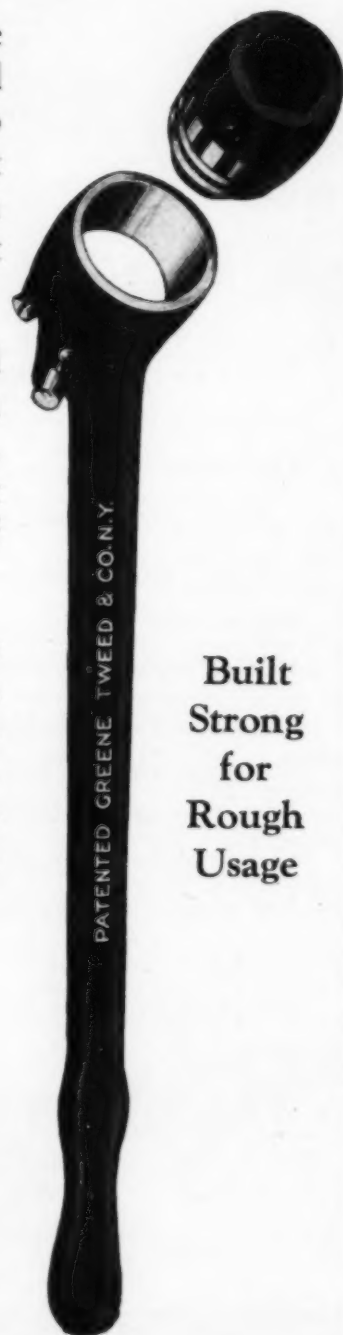
Leading Contractors use the "FAVORITE" Wrench for speeding up the nut-turning portion of the contract, especially where the saving of time is a very important consideration.

Write us for full particulars.

Greene, Tweed & Co.

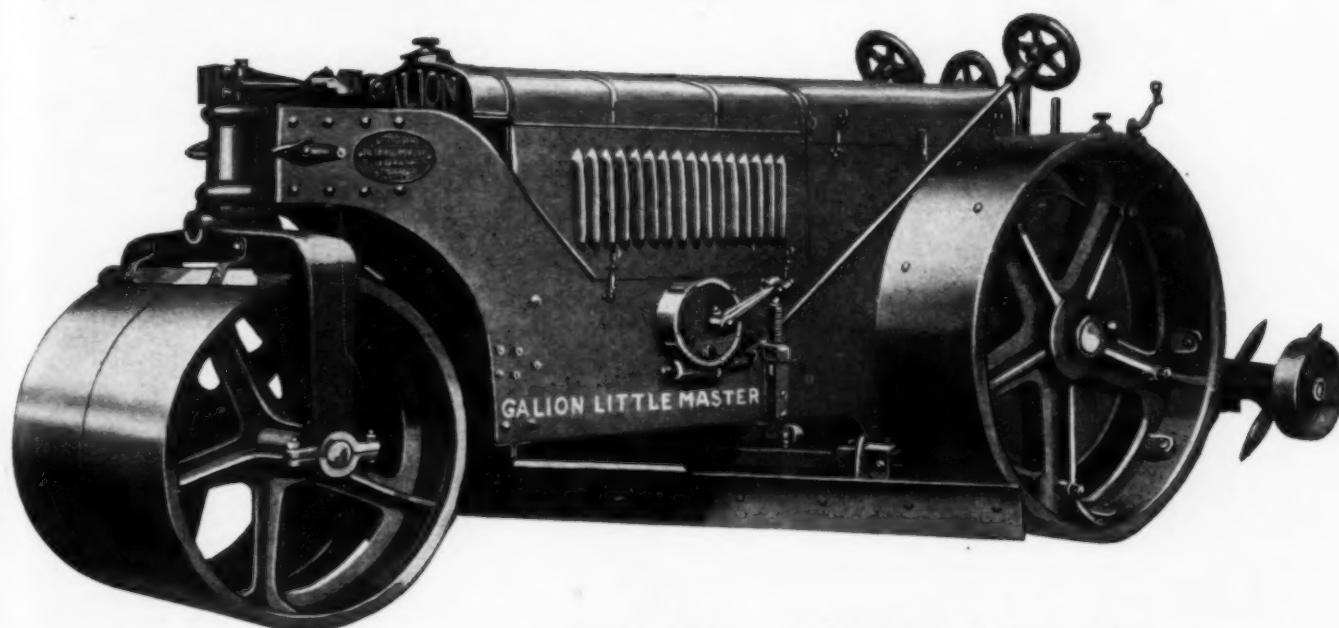
Sole Manufacturers

109 Duane St., New York



**Built
Strong
for
Rough
Usage**

a little Master



.. of the Big Jobs

Galion Distributors

W. A. Adams Tractor & Equip. Co.,
Raleigh, N. C.
R. S. Armstrong & Bro. Co., Atlanta, Ga.
O. B. Avery Co., St. Louis, Mo.
Badger Tractor & Equip. Co., Milwaukee, Wis.
W. D. Banker Road Machy. Co., Memphis, Tenn.
Banks-Miller Supply Co., Huntington, W. Va.
Borchert-Ingersoll, Inc., St. Paul, Minn.
Brown-Fraser & Co., Ltd., Vancouver, B. C.
Dukehart Machy Co., Des Moines, Iowa
Easton Tractor Co., Cambridge, Mass.
Feenaughty Machy. Co., Portland, Ore.
Frankfort Equip. Co., Frankfort, Ky.
Good Roads Machy Co., Inc., New York, N. Y.
Hall Perry Machy. Co., Butte, Mont.
Herd Equip. Co., Oklahoma City, Okla.
Interstate Machy. & Supply Co., Omaha, Nebr.
Jeffrey Mfg. Co. Ltd., Montreal, Que.
Jenison Machy. Co., San Francisco, Cal.
C. H. Jones Co., Salt Lake City, Utah.
Lewis-Patten Co., San Antonio, Texas.
Lewis Tractor & Machinery Co., Fargo, N. D.
Marsh Equip. Co., Colby, Kan.
Miller & Requarth, Springfield, Ill.
Morrow Auto Co., Albuquerque, New Mexico
H. W. Moore Equip. Co., Denver, Colo.
Morrissey Easton Tractor Co., Vicksburg, Miss.
Murphy & Murphy, Little Rock, Ark.
C. T. Patterson Co. Inc., New Orleans, La.
G. C. Phillips Tractor Co. Inc., Birmingham, Ala.
Power Equip. & Service Co., New Haven, Conn.
F. Ronstadt Co., Tucson, Ariz.
Salina Tractor & Thresher Co., Salina, Kan.
Bert Smith, Enid, Okla.
Smith-Booth-Usher Co., Los Angeles, Cal.
Standard Road Equip. Co., Rockford, Ill.
W. H. Stoutenburg, Penn Yan, N. Y.
Tennessee Tractor Co., Nashville, Tenn.
F. E. Vaughn, LaCrosse, Kan.
Virginia Road Machy. Co., Richmond, Va.
Welch Good Roads Supply Co., Welch, W. Va.

For those who have known and used the Galion Master, the Galion Little Master Roller needs no introduction other than to say . . . that it is like its larger brother in design and construction.

The Little Master embodies, to a degree never before attained in a small roller, the same simple unity, rigidity, strength and handsome appearance found in the Master Roller.

The Little Master uses the same transmission and Twin Disc Clutch that have proved so successful in the famous Galion Master. One piece heavy steel side frame plates . . . powerful steel pinion and gear . . . and renewable phosphor-bronze bearings for the rear axle are only a few of the features that make this Roller truly the Little Master of big jobs.

A Hercules Model K, 4-cylinder, 4-cycle motor furnishes the power for the Little Master. Three sizes . . . 6, 7 and 8 tons.

There's a Galion Roller for every job. Write the Galion distributor nearest you for bulletins describing them.



The Galion Iron Works & Mfg. Co.

Galion - - - - - Ohio

PUT IT ON ONE END

A simple material-moving idea that is earning thousands of dollars for contractors all over the country

Each Barber-Greene Conveyor Belt is a broad, swiftly moving highway that carries what you have to move in a steady, non-stop stream—from where you have it to where you want it.

Carries up to 300 lineal feet, and elevation angles up to 35 degrees are not uncommon.

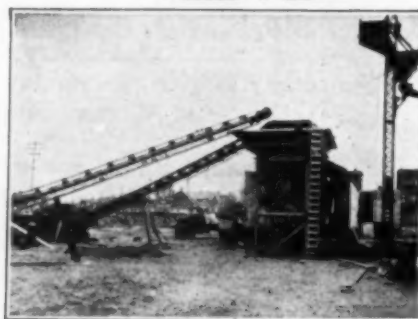
You simply put the stuff on one end and watch it come off the other.

The flexibility of Barber-Greene Set-ups, which can include one or more portable or permanent conveyors, is almost unbelievable.

For these standardized units can be arranged and re-arranged to meet almost any condition, cheaply and efficiently.



Wet concrete direct to forms

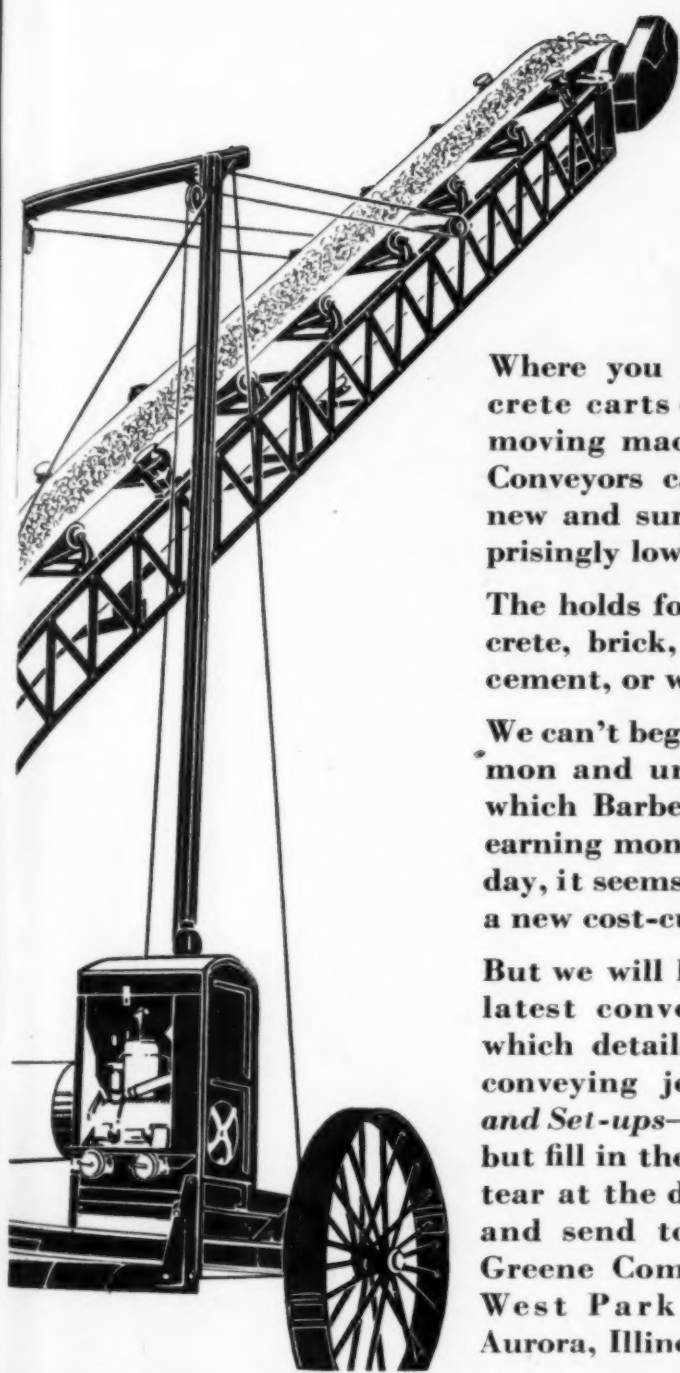


Sand and gravel at the central plant



Mixer to forms on small job

BARBER GR



WATCH IT COME OFF THE OTHER

Where you see wheelbarrows, concrete carts or expensive material-moving machinery, Barber-Greene Conveyors can likely supply you a new and surprising answer—at surprisingly low costs.

The holds for sand, gravel, wet concrete, brick, refuse, bagged or bulk cement, or what have you.

We can't begin to list the many common and unusual applications on which Barber-Greene Conveyors are earning money for contractors. Each day, it seems, a contractor works out a new cost-cutting use.

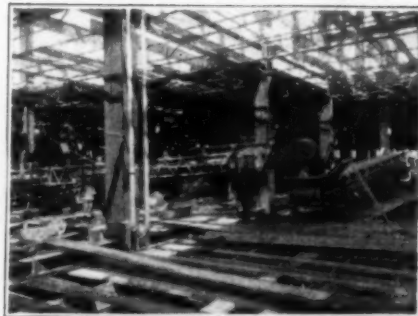
But we will be glad to send you our latest conveyor application book which details a variety of different conveying jobs—*New Applications and Set-ups*—if you will but fill in the coupon—tear at the dotted line and send to: Barber-Greene Company, 530 West Park Avenue, Aurora, Illinois.



Filling two batcher bins



Sand, gravel, excavated material

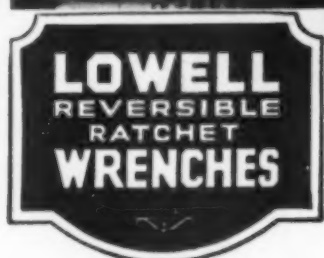
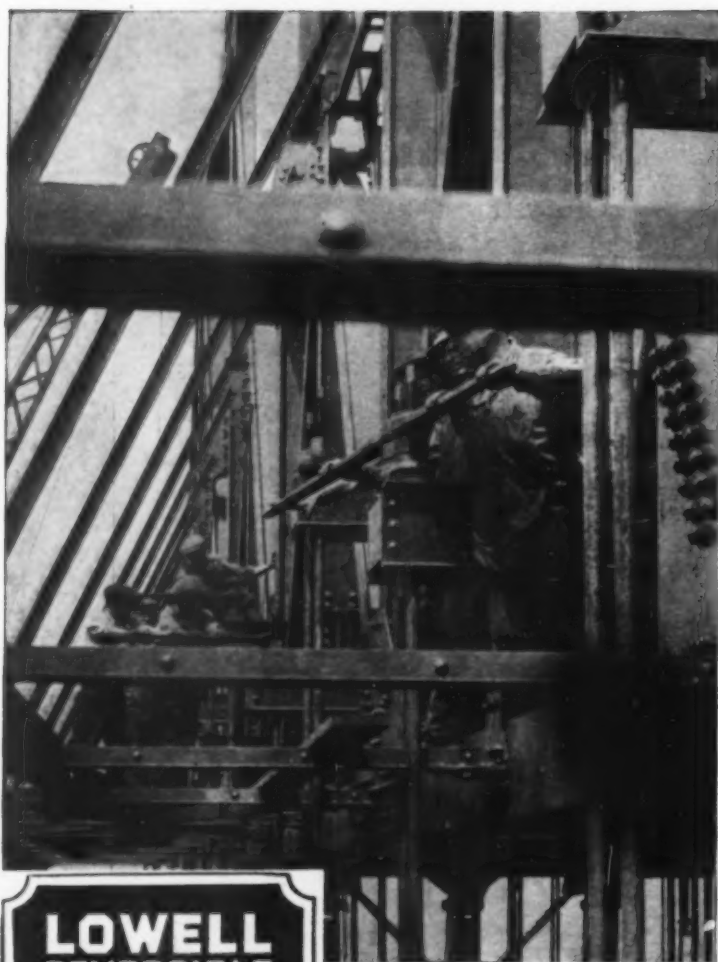


Pouring floors in a big building

BARBER-GREENE

BARBER-GREENE COMPANY, 530 West Park Avenue, Aurora, Illinois
Send me a copy of *New Applications and Set-ups*.

Name.....
Address.....
City..... State.....



On the Job
with the
DRAVO
CONTRACTING
COMPANY
of
PITTSBURGH

BUILDING BRIDGES

Sixteen of these husky Lowell Wrenches were furnished for this one bridge job. And that was after the Dravo Company made exhaustive tests on the safety, dependability and economy of Lowells.

The tests proved that when a Lowell is fixed to a nut, the man is safe in putting all of his energy into driving the nut tight. For Lowells don't know how to fail—they don't slip—they're built with a wrench knowledge of 60 years. And the ratchet feature is a distinct economy. There is no lost time in re-fitting the wrench to nut—once there, the Lowell stays put 'til the nut is pumped tight.

Lowells can play an important part in saving time on almost any construction job. Write for Catalogue "R," which shows you how.

LOWELL WRENCH COMPANY
WORCESTER, MASSACHUSETTS



You'll Like This Oil Burning Kettle

Style "J"
Made in 50-,
75-, 100- and
165-gallon
sizes



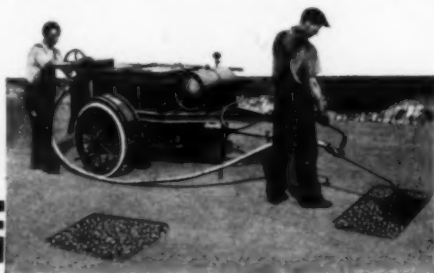
Here are some of the reasons why every highway department should use Connery's Style "J" Oil Burning Kettle:

- Two-compartment hinged covers. Barrel grids underneath.
- Easy working pressure pump.
- Fuel tank copper brazed, galvanized inside and out. Stays in same position when trailing and in operation.
- Cast steel pulling ring.
- Valve control of temperature.
- Improved Connery Oil Burner.
- Heavy duty axle.
- Heavy duty standard roller bearings with large grease cups in wheel hubs.
- Connery's Improved Springs absorb road shocks.
- Rubber-tired wheels (optional equipment).
- Steel wheels with roller bearings standard.
- Heat-resisting guards to protect rubber tires from heat (optional equipment).
- Connery's patented tubes and stiffeners, prevents outside shell from warping.
- Inside tank removable for cleaning.
- Materials No. 10 and 12 steel, inside tank and outside shell; except 165-gallon kettle, which is made of No. 10 entirely.
- Oil Burner can be removed for thawing in winter, or other purposes.
- Heavy improved drop leg.
- Heat-resisting steel guard to protect fuel tank from heat.
- Non-leakable draw-off faucet.
- Removable wind-shield to protect burner.

Equipped with Hand Spraying Attachment, Style "J" Oil Burning Kettle will guard any highway with economy and efficiency. Easy to handle—quick to heat. A first-rate investment that always pleases.

We manufacture a full line of Tar and Asphalt Kettles, Oil Burning Kettles, Pouring Pots, Torches, Hand Spraying Attachments, etc. Send TODAY for our illustrated "Blue Book."

CONNERY & COMPANY, INCORPORATED
American & Luzerne Sts., Philadelphia, Pa.



*In the
Public
Eye*

THE "HY-LO"

Think about public safety and protection of your interests in the light of Dietz Red Lanterns — best understood and most dependable signal lights used on road construction jobs at night — unequalled for low cost and oil saving.

Dietz "Hy-Lo" Hot Blast Lantern has a popular feature in its direct globe lift. The globe is lifted upward by one finger—no lever being required.

R. E. DIETZ COMPANY
NEW YORK

Largest Makers of Lanterns in the World
Founded 1840





never before

**have you seen
Buckets like these!**

For ability to dig hard material, the new WILLIAMS "Champion" goes beyond any previous bucket.

In all our experience we have never seen the equal of the new WILLIAMS "Champion" for *digging power*— and for *speed*.

21 improvements—including the narrower and more rigid head—the larger diameter sheaves—sturdier corner bars, extending beyond the scoops and giving extra leverage—all-welded scoops of new easy-filling design—and many other improvements, have made it possible to place the new WILLIAMS "Champion" on your work with the definite guarantee to *Outdig and Out-speed any other bucket built*.

Before you buy a bucket, it will pay you to try the new WILLIAMS "Champion"—it *challenges competition, and invites comparative test*.

G. H. WILLIAMS COMPANY

607 Haybarger Lane, Erie, Pa.

Branch Offices: New York, Pittsburgh, Chicago

The WILLIAMS Power-Arm builds up the digging force with minimum cable overhaul, combining the lever and block-and-tackle—in the one way that avoids all "side leads" of closing cable.



Chisel Shaped Teeth, of Chrome nickel steel, add to the digging efficiency.



WILLIAMS
FAST-DIGGING BUCKETS

157

The Heaviest-Load Ever Moved with ONE TRAILER

~on a 65 Ton ROGERS

GEROSA HAULAGE & WAREHOUSE CORPORATION
HAULING CONTRACTORS
AND YARDS
STORAGE WAREHOUSES
250 EAST 137TH STREET
NEW YORK
April 5, 1930

TRAILERS AVAILABLE FOR HAULING OF ALL DESCRIPTIONS

MOTOR TRUCKS WITH POWER WINCHES OF ALL CAPACITIES

Rogers Brothers Corporation,
Albion, Pennsylvania.

Gentlemen:

You no doubt will be interested to know that we recently hauled a tunnel shield, weighing 163 tons on our 65 ton, 8 wheel trailer for the Cornell Contracting Co. of New York City.

This shield is one of the two which we are to haul. We understood that these shields would weigh 120 tons, which we felt certain your trailer would carry. The actual weight was not known until the shield was well on its way. This we were given to understand is the heaviest load ever moved with one tractor and trailer. Both were thoroughly inspected after the completion of the job, and there was absolutely no damage to either.

The value of each shield is \$40,000.00 and its loss while not in operation is \$1,200.00 per day. Our total moving time, including the time we had to wait for the removal of overhead wires, was 16 hours. Our actual running time was 46 minutes.

Up to the present time we have always been capable of handling any heavy jobs that were conferred upon us.

Yours very truly,
Lawrence Gerosa
GEROSA HAULAGE & WAREHOUSE CORP.

Mr. Gerosa deserves congratulations.

The tremendous tunnel shield which he moved in New York, weighing 167 tons including blocking, is the largest concentrated load ever moved on one trailer.

The fact that his 8-wheel, 65 ton Rogers Trailer performed perfectly under this extreme test, without damage, speaks volumes for Rogers construction.

While such enormous overloads are not, of course, recommended, this example clearly illustrates the unequalled margin of safety which is built into every Rogers Trailer, from the standard 80 ton model down to the 7½ ton size embodying the same principles of design.

Write today for catalog.



Although cables were strung from cranes as a precaution in moving down grade, they proved entirely unnecessary, as the extra large Rogers brakes on all 8 rear wheels provided ample braking power.

ROGERS BROTHERS CORPORATION
106 Orchard Street
Albion, Penn.

Actual facts



V. L. CALDWELL
S. CALDWELL

CALDWELL BROTHERS & BOND BROTHERS
GENERAL CONTRACTORS
518 HOWARD AVENUE
TREASURER: HAYWOOD 6818
NEW ORLEANS

March 31st, 1930.

Lone Star Cement Company
1120 Hibernia Bank Building,
New Orleans, Louisiana.

Gentlemen:

Answering your inquiry as to our use of your "INCOR" cement in the construction of the Municipal Auditorium:

We take pleasure in giving you the following data:

Our contract with the City of New Orleans for the Municipal Auditorium - \$1,565,000.00 - was signed on February 15, 1929, and work started two weeks later. As you probably are aware, it was specified that the Auditorium should be turned over to the City on January 1, 1930, with a penalty of \$500.00 daily for each day's delay thereafter.

We have no hesitancy in telling you that our completion of this job on schedule time was largely due to the use of "INCOR", your High Early Strength Portland Cement.

The original specifications stipulated forms were to remain in place twenty one days after pouring of concrete. You can appreciate what it meant to us to be able to remove the basement column forms, and to back fill within twelve hours after pouring with "INCOR".

By using "INCOR", we obviated the necessity of using any admixtures, and all of our waterproofing was done with this cement.

We are writing you this as an indication of our entire approval of "INCOR" cement, which we used with every degree of success, and expect to take advantage of its high early strength qualities on many jobs in the future.

Very truly yours,

CALDWELL BROTHERS & BOND BROTHERS

Per

New Municipal Auditorium, New Orleans. Architects: Favrot and Livandais. Contractors: Caldwell Bros. & Bond Bros.

READ, in the above letter, how "INCOR" Brand Perfected High-Early-Strength Portland Cement helped make it possible to open the magnificent New Orleans Municipal Auditorium on time.

"INCOR" ends costly delays—makes possible completion of more and larger contracts during one construction season—lowers overhead costs—releases equipment sooner.

"INCOR" contains no admixtures... requires no special methods of handling. It combines the outstanding quality of Lone Star Cement with the added advantage that "INCOR" produces *Portland Cement* concrete that is ready to use in 24 hours.



**SUBSIDIARIES OF THE
INTERNATIONAL CEMENT CORPORATION**
342 MADISON AVENUE, NEW YORK, N. Y.

LONE STAR CEMENT COMPANY ALABAMA
LONE STAR CEMENT CO. INDIANA, Inc.
THE CUBAN PORTLAND CEMENT CORP.
LONE STAR CEMENT CO. PENNSYLVANIA
THE LONE STAR CEMENT CO. (KANSAS)
LONE STAR CEMENT CO. VIRGINIA, Inc.
LONE STAR CEMENT CO. NEW YORK, Inc.
LONE STAR CEMENT CO. LOUISIANA
ARGENTINE PORTLAND CEMENT CO.
LONE STAR CEMENT COMPANY TEXAS
URUGUAY PORTLAND CEMENT COMPANY

INTERNATIONAL CEMENT CORPORATION

1/2-YD. SHOVEL



HUSKY is the word that describes this new half-yard convertible excavator — huskily built throughout. Large-diameter power shafts of heat-treated chrome alloy steel. Double-cone hoisting, crowding and sluing frictions. Base, turntable and boom heavily constructed and completely electric welded. In fact, every part designed to withstand the hard knocks to which small excavators are subjected.

Speed and ease of handling also are features of the Model 4. Accelerator controlled 40-hp. gasoline engine equipped with variable-speed transmission. Travels $\frac{5}{8}$ to 3 miles an hour, and will climb a 25 per cent grade. Fast crowding, hoisting and swinging enables this new machine to make five trips per minute in regular operation.

The Model 4 is readily convertible to shovel, crane, dragline, ditcher or skimmer. Write for details and prices.

ORTON CRANE & SHOVEL CO.

608 S. Dearborn Street, Chicago, Illinois
Representatives in Principal Cities

ORTON

Cranes, Shovels & Buckets

NEW

HUSKY



Concreting a canal with "CATERPILLAR" TRACTORS[★]

WATER flowing through this canal is used five times for power—once for irrigation. So it's precious—it is worth while to line the canal and reduce friction and seepage. Four "Caterpillar" Thirtys are on the job; each machine helps concrete 300 linear feet a shift, hauling material and moving the outfits ahead. And the "Caterpillar" can

turn around in these cramped quarters.

Power, traction and dependability!

Prices—f. o. b. Peoria, Illinois

TEN . .	\$1100	TWENTY .	\$1900
FIFTEEN .	\$1450	THIRTY .	\$2375
SIXTY . .	\$4175		

Caterpillar Tractor Co.

PEORIA, ILL. and SAN LEANDRO,
CALIF., U. S. A.

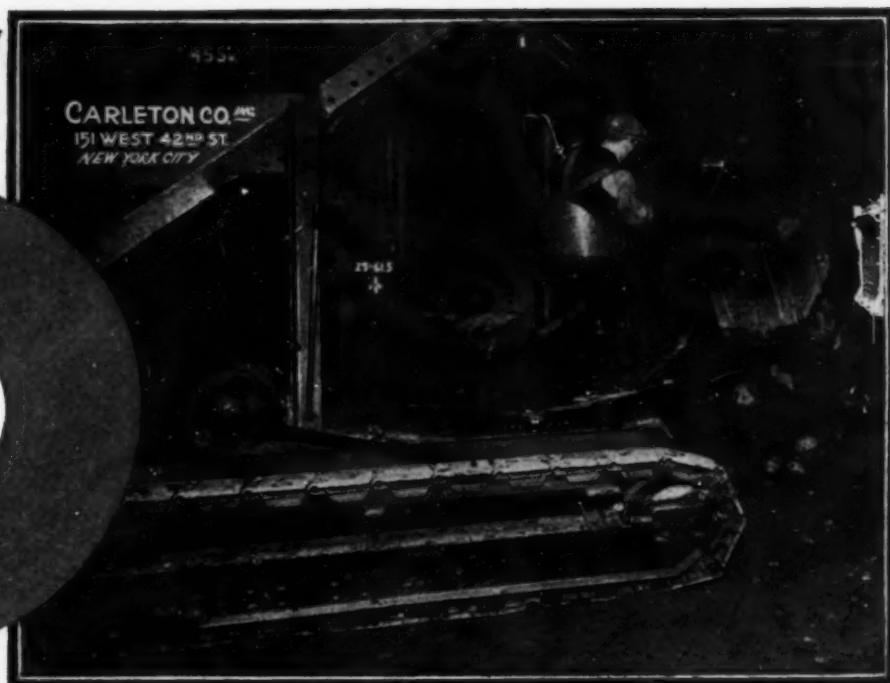
Track-type Tractors Combines Road Machinery
(There's a "Caterpillar" Dealer Near You)



★The Bear River Canal Enlargement Project of the
Pacific Gas & Electric Co., Colfax, California

CATERPILLAR
REG. U. S. PAT. OFF.
TRACTOR

6



TRACTOR SHOVELS IN 5 MONTHS

WHAT better recommendation for any piece of equipment? When the Carlton Company started work on a section of the Brooklyn subway construction they called on their two BAY-CITY Tractor Shovels to clean up the loose earth, rocks and boulders left by the big shovels. So well did these speedy, mobile, efficient machines do their work (equipped with special booms to reach in under the low roof at the sides and in between supports) that the Carlton Company ordered a third Bay-City in December and a fourth machine in January.

And now—they have wired for two more Tractor Shovels, equipped with short 18 ft.

crane booms and convertible for shovel service.

These machines are operating two shifts—day and night—with a saving of many hand laborers and much time. All of which brings us up to the fact that the Tractor Shovel is not intended for work which requires the power and strength of a $\frac{3}{4}$ yard machine. It is rather designed to fill the gap between hand labor and heavy high-priced equipment—to handle those jobs which do not require large, heavy machines and which can be handled more economically with smaller equipment.

Repeat orders of this kind emphasize BAY-CITY popularity and superiority. Write for Catalog T-6 and further information.

BAY CITY SHOVELS, Inc.
BAY CITY, MICH.

New York Office—302 Broadway

BAY-CITY SHOVELS

**THE BAY-CITY FAMILY
OF FAST WORKERS**



One hundred and ten 2 K. W. 110-volt Kohler Electric Plants ready for shipment to the U. S. Government

guiding the ships of air and sea

THROUGH the night sweeps a powerful beam over land and sea, signalling safety to navigators of air and water. Confident eyes watch for these lights from the cockpits of mail planes; officers on the bridges of liners, freighters and private craft check and set their courses. Power from Kohler Electric Plants operates hundreds of these beacons and these lighthouses.

Over 1000 Kohler Electric Plants are in use by various departments of the U. S. Government. Of the latest shipment of 110, one hundred are being installed along the airways for visual and radio beacons and ten in lighthouses, giving reliable, automatic, independent electric power that safeguards life and property. Other governmental users include the Army and Navy, the Department of Justice (standard and emergency lighting for prisons and prison camps), National Park Service, Indian Irrigation Service, Commission of Forestry and the Coast Guard. Scores of these plants are used on cruisers and destroyers.

Kohler Electric Plants generate current at 110 volts D. C., or 3-phase 220 volts A. C. Capacities from 800 watts to 10 K. W. They make night work practical, safe and profitable. For floodlights, operating motors, pumps, air compressors, lathes, portable electric tools. Kohler Plants are compact, rugged, self-contained and can be transported over rough country without damage. They operate without storage batteries. For complete information, send the coupon today. Kohler Company. Founded 1873. Kohler, Wis.—Shipping Point, Sheboygan, Wis.—Branches in principal cities. . . . Manufacturers of Kohler Plumbing Fixtures.

KOHLER OF KOHLER ELECTRIC PLANTS

KOHLER CO., Kohler, Wisconsin
Gentlemen:

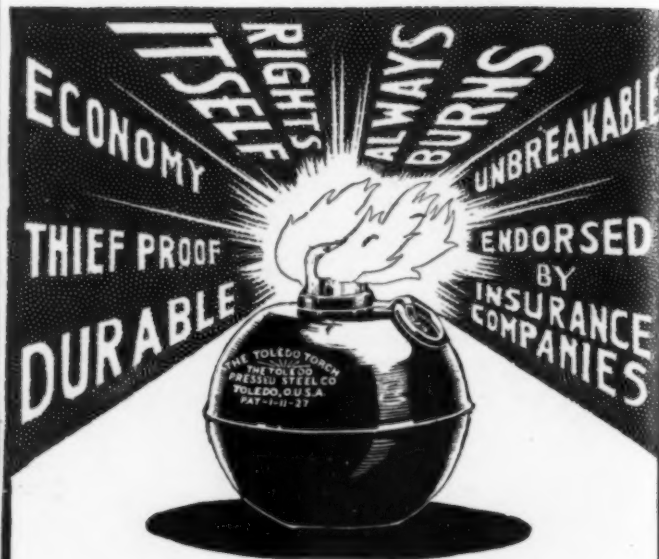
CM 5-30

Please send catalog describing Kohler Electric Plants.

Name _____ Street _____

City _____ State _____

Use in which interested _____



150,000 Toledo Torches

Everywhere, under a wide variety of difficult conditions, TOLEDO Torches are doing a real job of safety lighting. Driving rain, hail, snow or stiff, tricky winds never dim the bright, warning flare of these sturdy, indestructible little sentinels.

The demand for these torches is steadily increasing because TOLEDO Torches are better. Better because they are different. Different because every TOLEDO Torch is equipped with our patented Economy burner, which cuts fuel cost in two — eliminates wick consumption.

Insist on the genuine TOLEDO
Torch. Your dealer can supply you



The Toledo Pressed Steel Co.
TOLEDO OHIO

Save with Steel

Manufacturers of the Toledo Folding Steel
Horse — the ideal highway barricade



**"We Procure Maximum Quality
and Minimum Prices**

OUNGSTOWN RUBBER PRODUCTS CO.

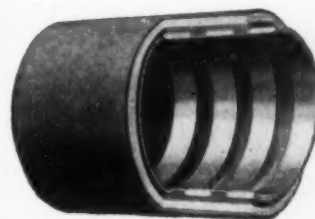
Above—Mr. G. A. Voorhies and Mr. W. F. Burr, of The Youngstown Rubber Products Company of Youngstown, Ohio. This company's services are of a definite economic value to the prosperity of its business territory.

MANUFACTURERS approach us knowing they are in competition with others who desire the volume we have. They realize that to earn our volume they must offer a maximum of quality at minimum prices. This price advantage we bring to consumers. Our recommendations are worthy of thought, and we recommend Republic's Belting—Hose—Packing—Molded and Lathe Cut Goods."

The above statement is characteristic of those made by prominent distributors all over the country. It explains in part how the Industrial Supply Distributor, helping to solve the important problem of broad markets and economical distribution, upholds high quality, maintains fair prices and saves needless efforts on the part of both consumer and manufacturer.

**THE
REPUBLIC RUBBER CO.**

**Youngstown
Ohio**



Whether it be for sand suckers—loading or unloading oil, or, molasses, or, such work as contractors must do every day, Republic's Suction Hose will meet every requirement economically.

Send For Sample.

**REPUBLIC means
the Best Mechanical
Rubber Goods**



DIFFICULT? Yes, but a WARCO Does It!



WARCO One-Man "Road-Hog" power graders are engineered—not just assembled.

They are expected to do construction work, in keeping with their size (and you have three sizes for selection), as well as high class, fast maintenance.

WARCO oscillating rear-type crawlers hitch the power of your tractor to the ground. WARCO head-type steering, and three point motor suspension make such jobs as this possible.

Three sizes—six models—center and rear control power graders.

You owe it to yourself to thoroughly investigate WARCO graders, wheeled scoops and rear-type crawlers before you buy.

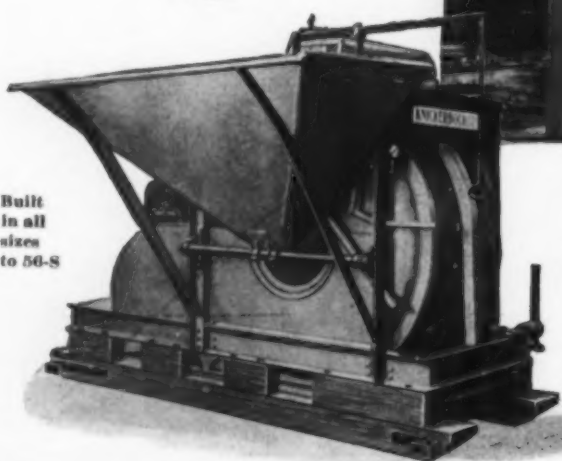
W. A. RIDDELL COMPANY, BUCYRUS, OHIO.

Power and Drawn Graders — Wheeled Scoops — Rear-Type Crawlers for Tractors

**"—so we are
standardizing
on
Knickerbockers"**



Built
in all
sizes
to 50-S



Niles Ferry Bridge over Little Tennessee River near Maryville, Tenn., built by Southern Construction Co., Birmingham, Ala., with one 10-S Knickerbocker Mixer.

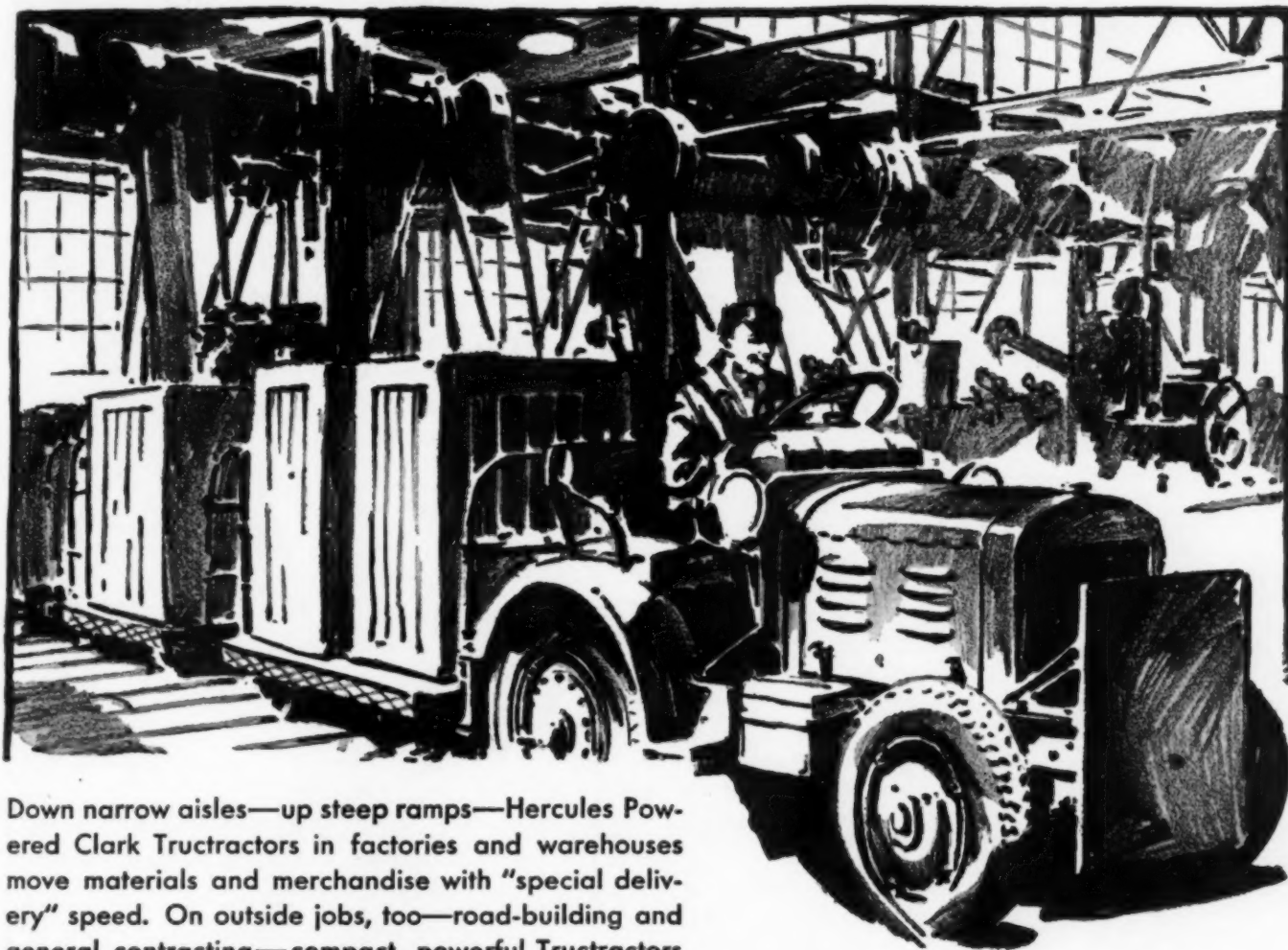
"—due to the dependability and reliability of the Knickerbocker 10-S Mixer, we were enabled to complete this bridge some months ahead of schedule time.

"We are thoroughly sold on Knickerbocker Mixers and are standardizing on them on all our work."

Southern Construction Company
Birmingham, Ala.

The Knickerbocker Company, Jackson, Mich.

Cutting Material Handling Costs with Hercules-Powered Tractors

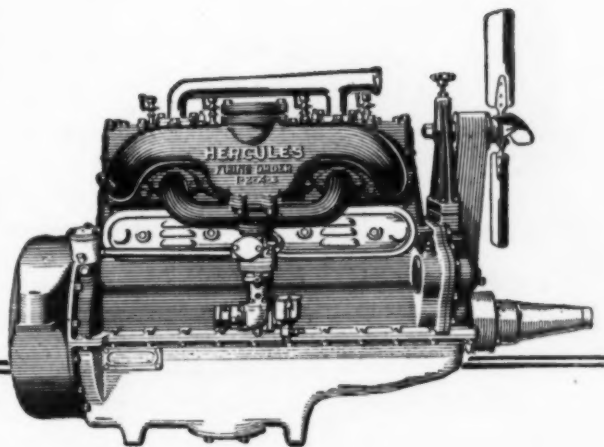


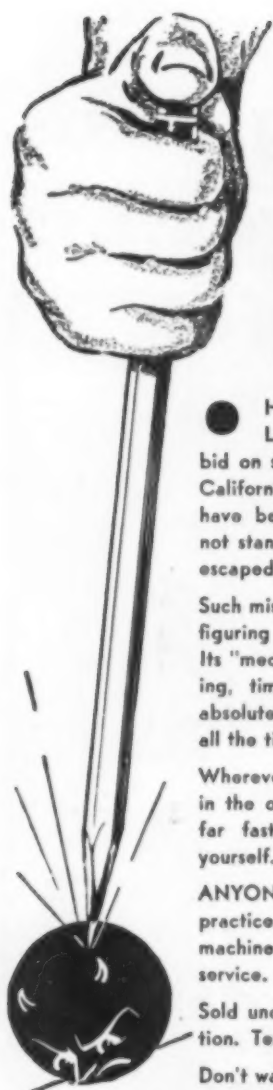
Down narrow aisles—up steep ramps—Hercules Powered Clark Tractors in factories and warehouses move materials and merchandise with "special delivery" speed. On outside jobs, too—road-building and general contracting—compact, powerful Tractors save time and money in material handling.

Hercules Engines are the choice of leading manufacturers of industrial machinery. They meet a wide variety of heavy-duty requirements—for they are available in Four and Six cylinder models ranging from 13 to 115 H.P. Manufacturers and users alike know that Hercules power is a virtual guarantee of reliable, low-cost operation.

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HERCULES ENGINES





That FIENDISH DECIMAL POINT

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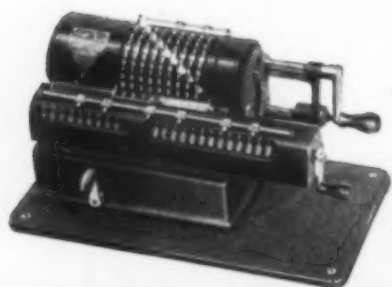
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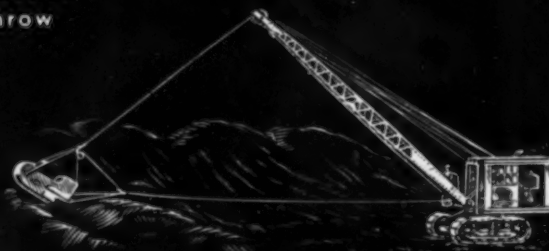
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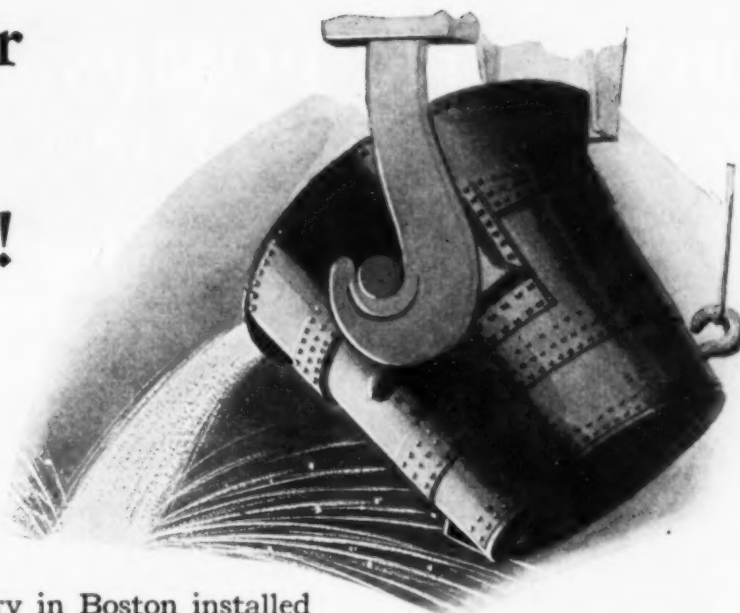


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Have you investigated Sullivan compressors? Capacities 68 to 5100 cu. ft. All drives. Catalogs on request.

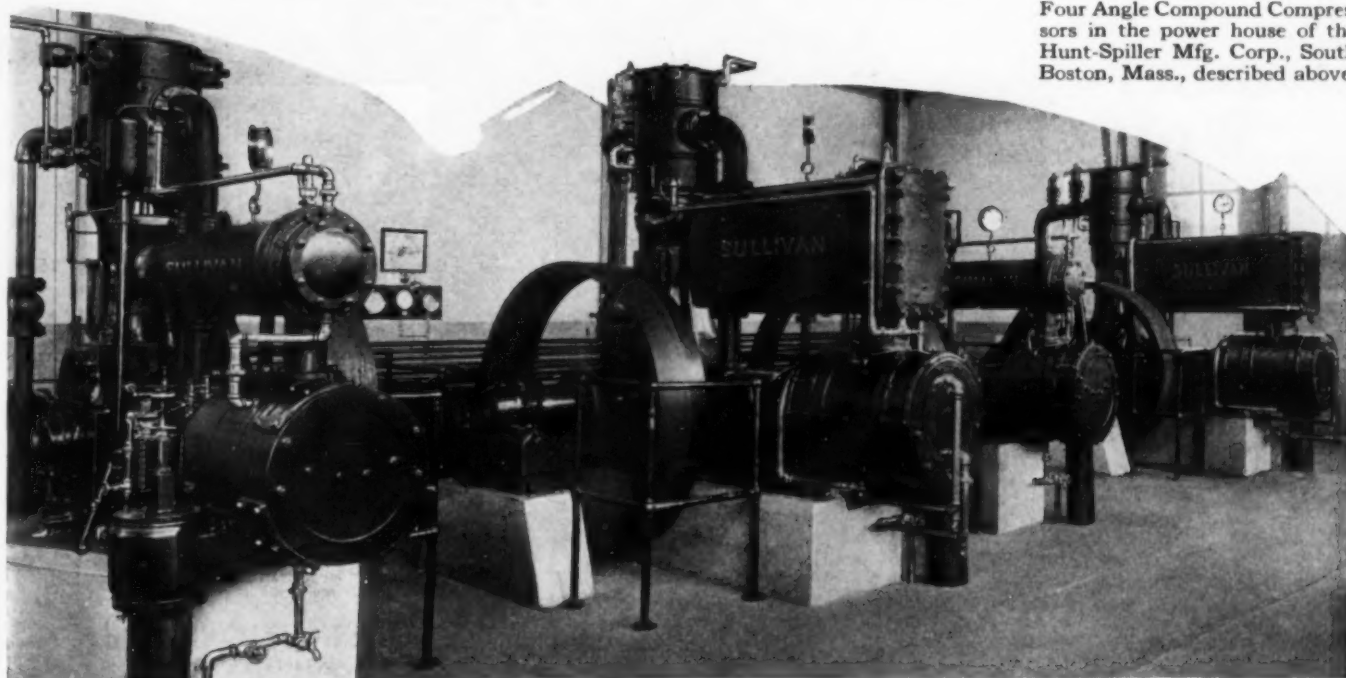
SULLIVAN AIR EQUIPMENT

SULLIVAN MACHINERY COMPANY

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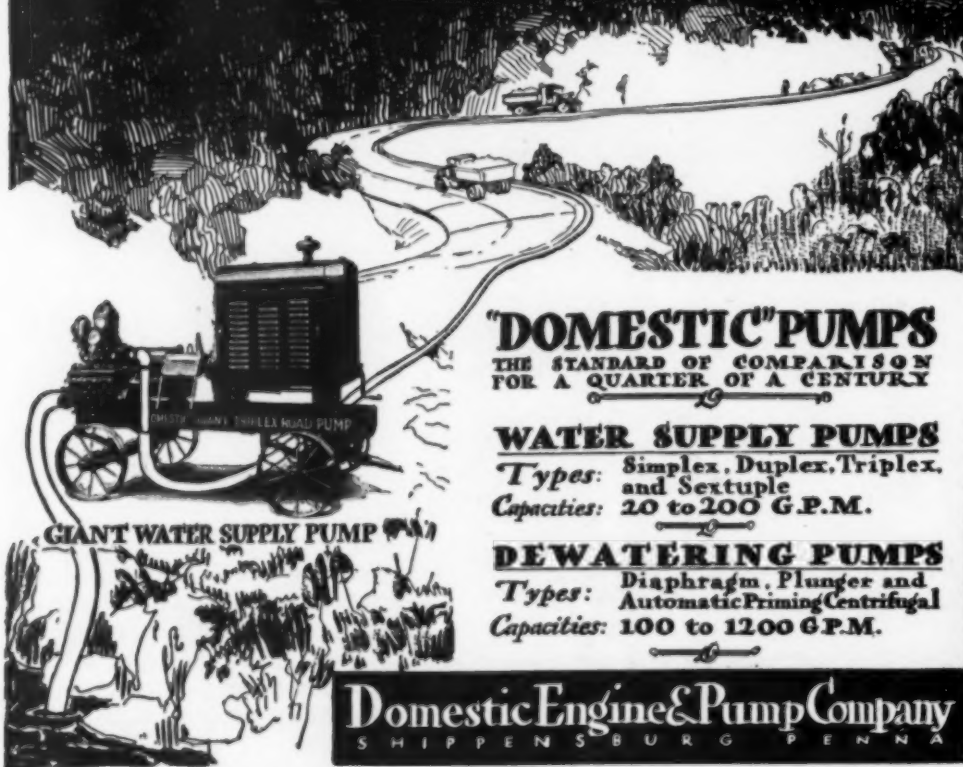
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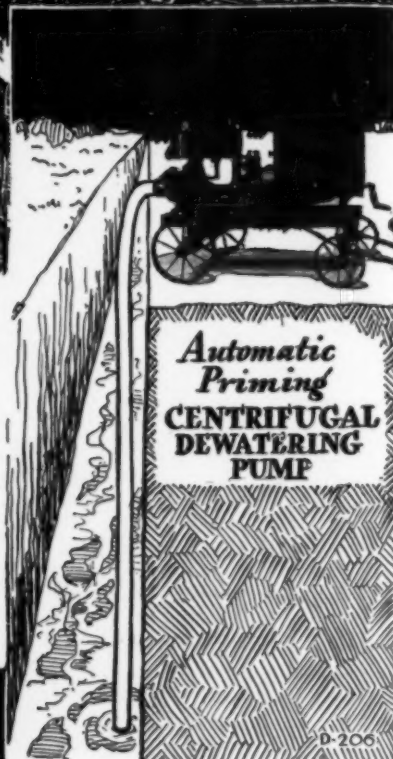


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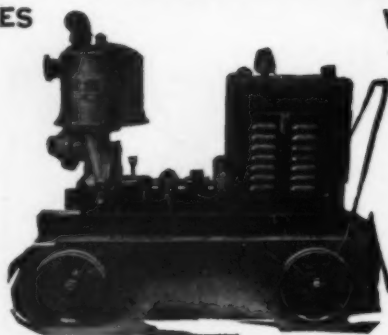
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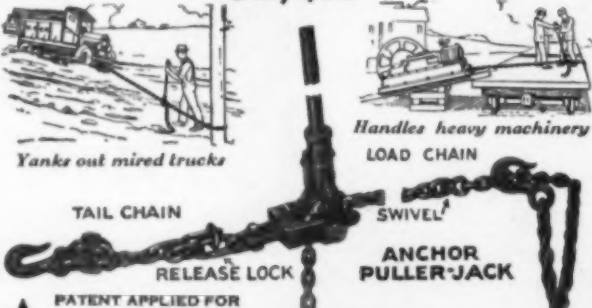
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Pumps — Chrome Alloy Impeller —
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Capacities from 100 to 1,500 gallons
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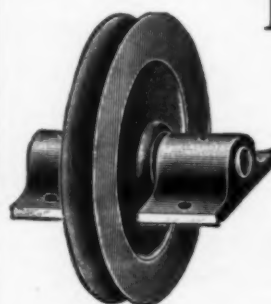
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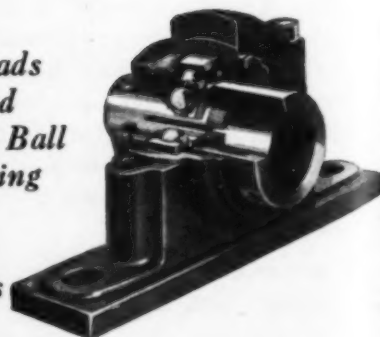
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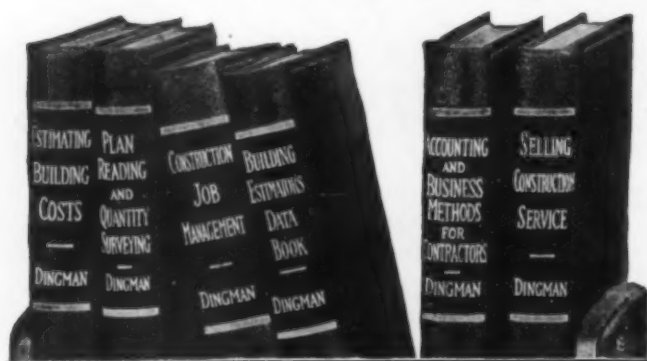
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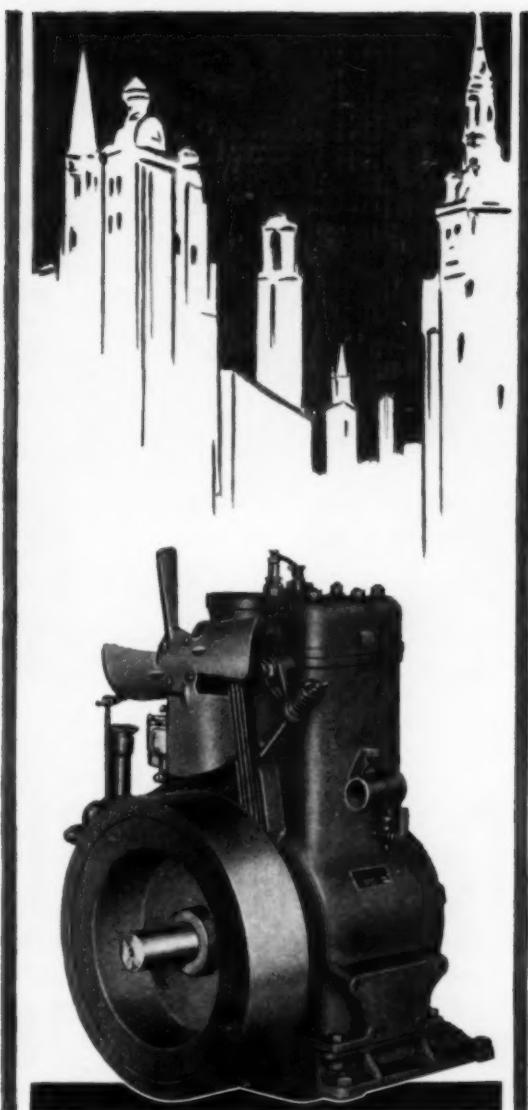
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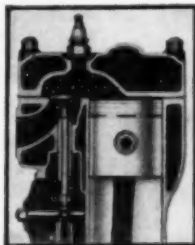
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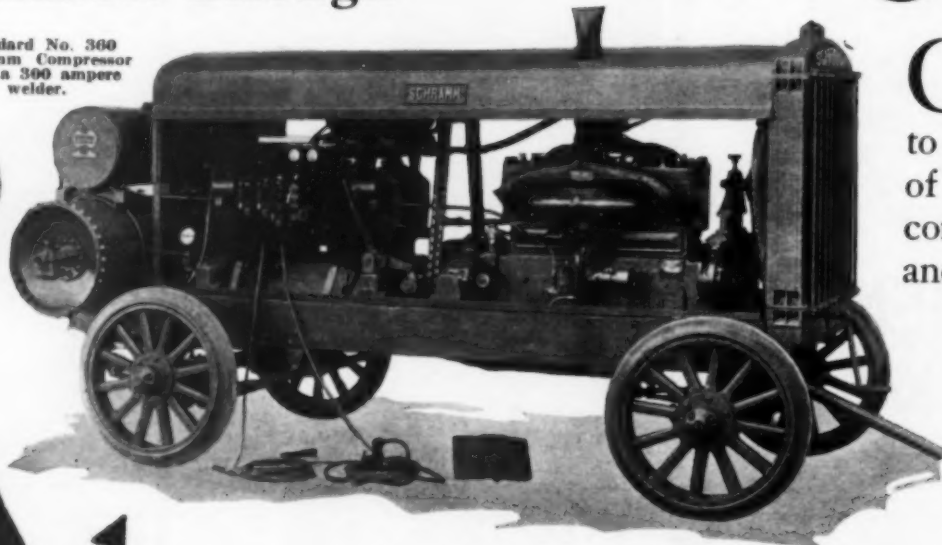
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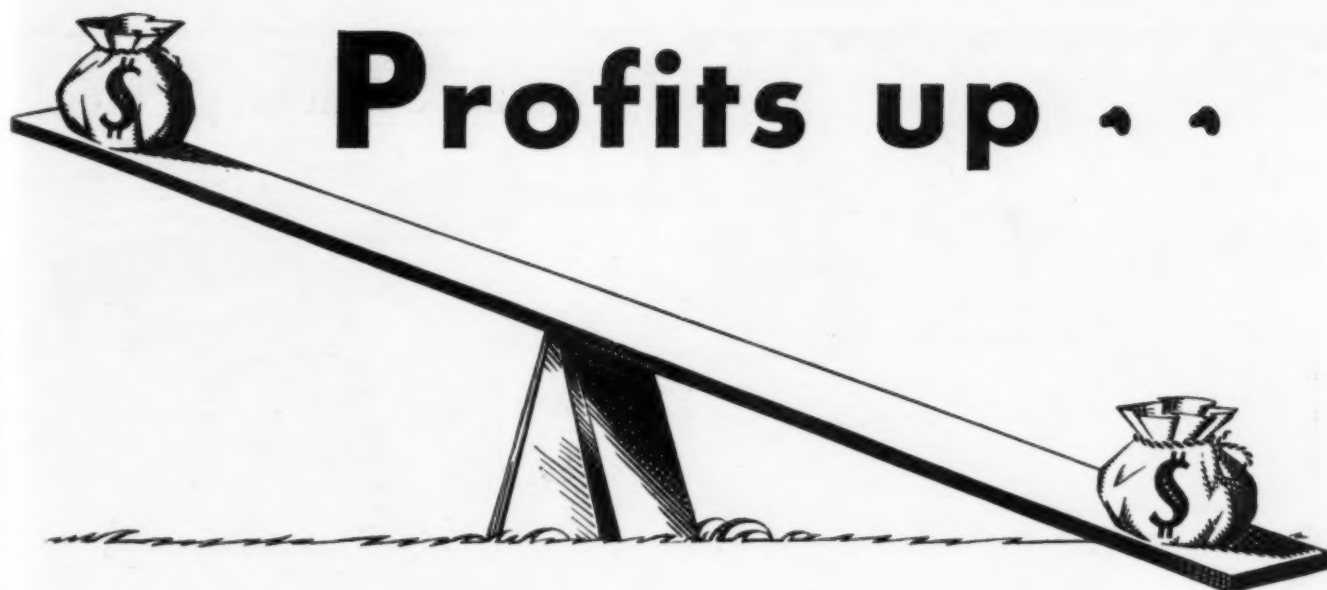
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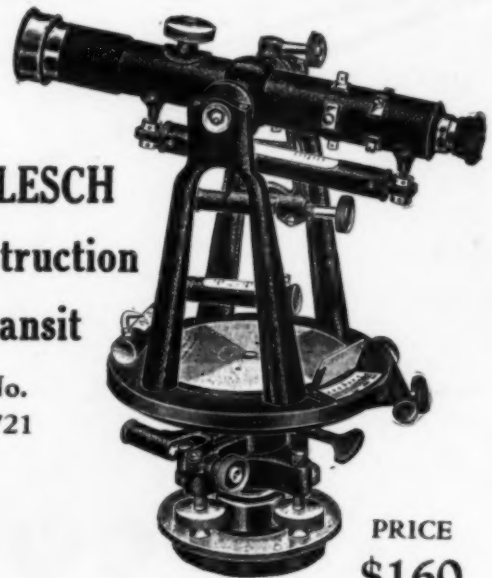
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Established 1885

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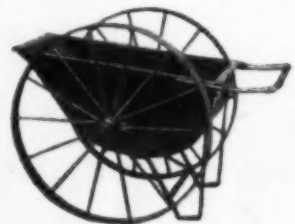
They Hold Down Costs

Dependability of equipment is a vital factor on the modern construction job where delays may mean the difference between a profit and a loss. That's why more and more contractors are standardizing on Bull Frog wheelbarrows, carts and scrapers. They have proved their stamina and easy-handling qualities on all types of jobs. There's a model for every contracting and industrial need. Ask your supply house, or write for catalog showing the complete line.

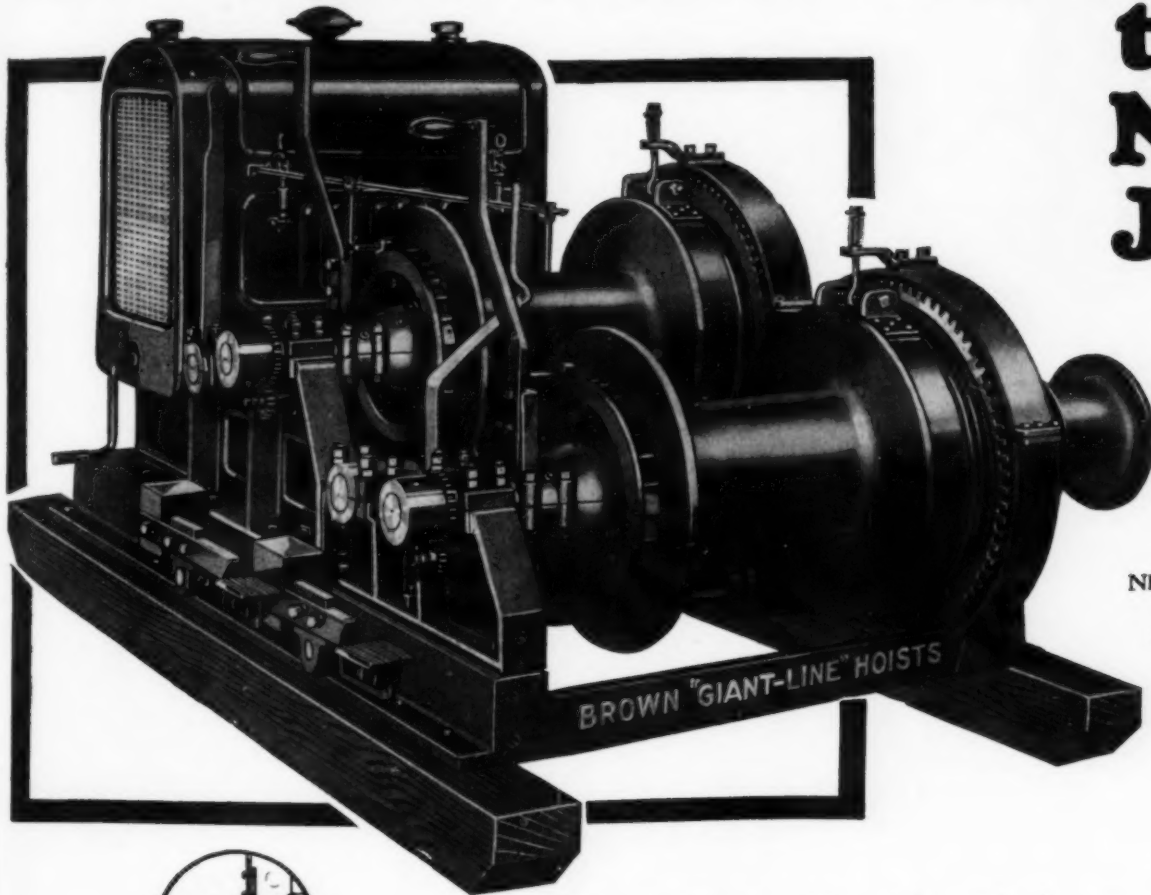
THE TOLEDO WHEELBARROW CO. TOLEDO, OHIO

Branch Office and Warehouse: CHICAGO—520 W. Erie St.

The Bull Frog Concrete Cart is the sturdiest cart you can buy. Made in two sizes, the larger of which can be supplied with either plain or roller bearings.



Have you a Good Hoist for that New Job?



NEW MODEL 30
SERIES
24 to 35 H.P.



The Hoist With The
EXCLUSIVE BRONZE SCREW
PAT. APP. FOR

No wobbly side frames, consequently no breakage—Let us tell you why!

The New Model 30 Series is available in single, double and triple drum units as well as Boom Swinger.

Equipped with new Series 24, 28, 32 or 35 H.P. Hercules Power Unit; rating 3,000 to 4,000 pounds single line pull at 200 feet per minute; Morse Silent Chain final drive; 10 in. dia. drums; large bronze bushings; Four bolt bearings; Flanged gear guards; Exclusive Bronze Screw Thrust; positive clutch release; Timken and Ball Thrust Bearings; Alemite lubrication throughout; side frames cast separate from base; shrouded pawl ratchet cast separate from drum; spring suspended easily adjusted brakes; non-spreading side frames; machine cut nickel semi-steel gears, etc., etc.

Old equipment, like old methods, are too costly for today's needs.

*One of the largest construction companies in the country recently purchased three new big double drum BROWN "GIANT-LINE" HOISTS (one with boom swinger) although they have a yard full of old hoists of almost every make.

You, too, will save money by junking old equipment—using new, modern, dependable BROWN "GIANT-LINE" HOISTS.

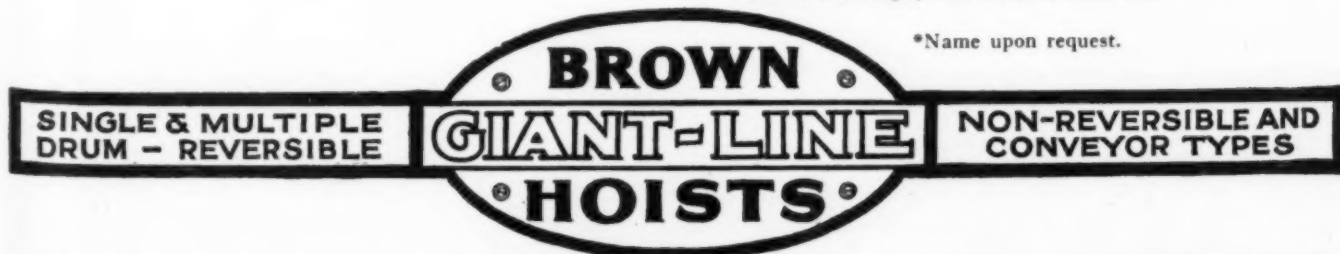
There is a size and type adapted to every requirement from 4 to 50 horsepower—each representing an outstanding value.

New 1930 Catalog B-1 upon request.

The Brown Clutch Co.

Sandusky, Ohio, U. S. A.

*Name upon request.



HOIST SPECIALISTS FOR A QUARTER CENTURY



BAKER MANEY Self Loading Scrapers



Model DR, 1 1/2 cu. yd.

Model KR 1 cu. yd.

THE BAKER MANUFACTURING CO., 568 Stanford Ave., Springfield, Illinois



Baker Maney Scrapers Now With Roller Bearings

You may now have Baker Maney Self Loading Scrapers in 1 cubic yard and 1 1/2 cubic yard capacities equipped with Timken Tapered Roller Bearings—a feature which insures greater operating efficiency and longer life.

The same short-turning ability—great strength and quick loading and dumping features which have built for them their reputation as efficient dirt movers are retained. Plain bearing models in 3/4, 1, and 1 1/2 cubic yard capacities are still available.

Send for 32-page catalogue on Baker Maney Scrapers—"the original self loaders."

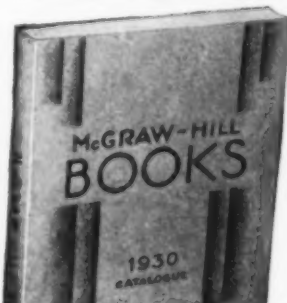
Write For These Bulletins:

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- Baker Rotary Scrapers ☐
- Baker Bulldozers ☐
- Baker Maintainers ☐



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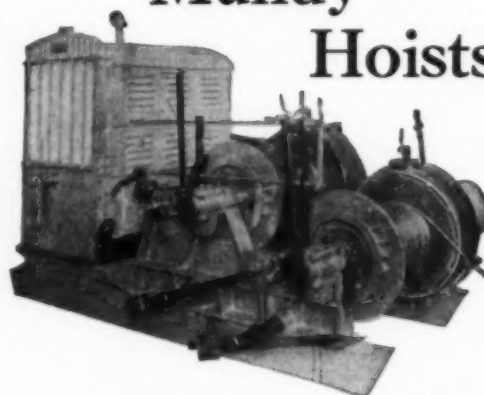
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Standard of the World

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Derricks

Car Pullers—Cableways

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Export Office, 30 Church Street, New York City
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TRADITION

PROGRESS



"Here, Lad—

I'm with you in putting this fellow 'Arc Welding' to work for us, but we've got to know more about him before we go ahead."

"No, Pop—

You mean before we go behind.

The way I look at it, the taking on of an arc welding machine isn't one whit different from taking on an employee.

First he's got to prove to us that he has specialized experience and thinks straight.

It's a matter of record that the thinking behind the Lincoln 'Stable-Arc' welder has been straight since it pioneered the art.

When those people took up specialization in arc welding equipment they advocated variable voltage.

Those not in welder specialization said 'No'.

How many say 'No' today?

How many say 'Yes' today?

And again comparing welders to employees—do you prefer 'Yes Men'—or specialists in the Know?"

**The Lincoln Electric Co.,
Dept. No. 32-5, Cleveland, O.**

**The Lincoln
'Stable-Arc' Welder**

— welds easier
— makes better welds
— permits greater output
because of the steady uniform arc throughout entire welding range, which is the result of:

Variable voltage design
Laminated magnetic circuit
Separately-excited generator field
Double control of welding heat
All steel construction
No other welder has all these features.

"Stable-Arc"

LINCOLN WELDER

W-144

Lectro molded BOOT

For excavating work....a new
boot molded in one piece
like an automobile tire
Greater Ease and Longer Wear



Above—Storm King Height
At right—Short Height
Also made in Sporting Height

The Lectro Molded Boot is built by an entirely new and different method to best withstand the grinding, cutting wear of sand, rough gravel, rocks, concrete, mud, water—every kind of hard going in construction work.

This new boot is actually molded in one piece under enormous pressure that makes the rubber many times tougher than ordinary boot stock. If your supply house cannot supply you with Lectro Molded Boots, write for a pamphlet which describes fully the unique features of this new boot.



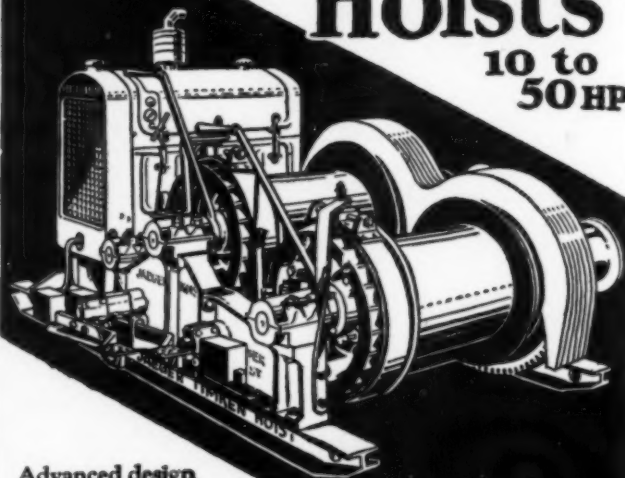
The Lectro Molded Boot is patented and made only by

HOOD RUBBER COMPANY, INC.
Watertown, Mass.

HOOD MAKES CANVAS SHOES • RUBBER FOOTWEAR • TIRES
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Jaeger Timken Screw Thrust Hoists

10 to
50 HP



Advanced design
throughout—positive
drum release, (no springs),
moulded asbestos friction
blocks, silent chain drive, etc.
Single or double, gas or electric.
New low prices. Send for catalog.
THE JAEGER MACHINE CO.
800 Dublin Avenue, Columbus, Ohio

\$600

buys double
drum, 4 cyl.
eng. SPEED
BOY—Get our
other prices!

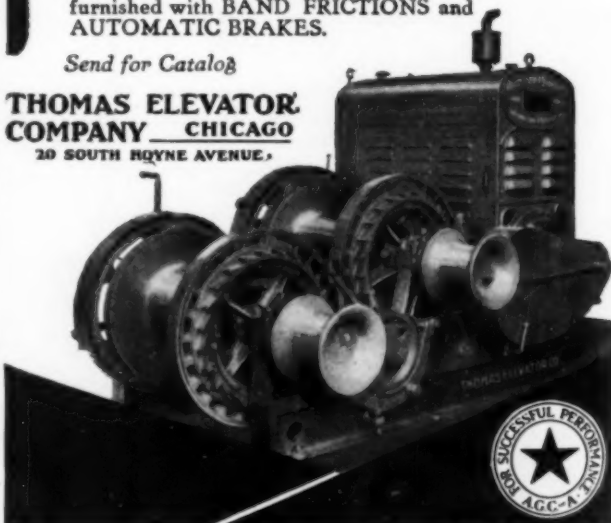
THOMAS HOISTS

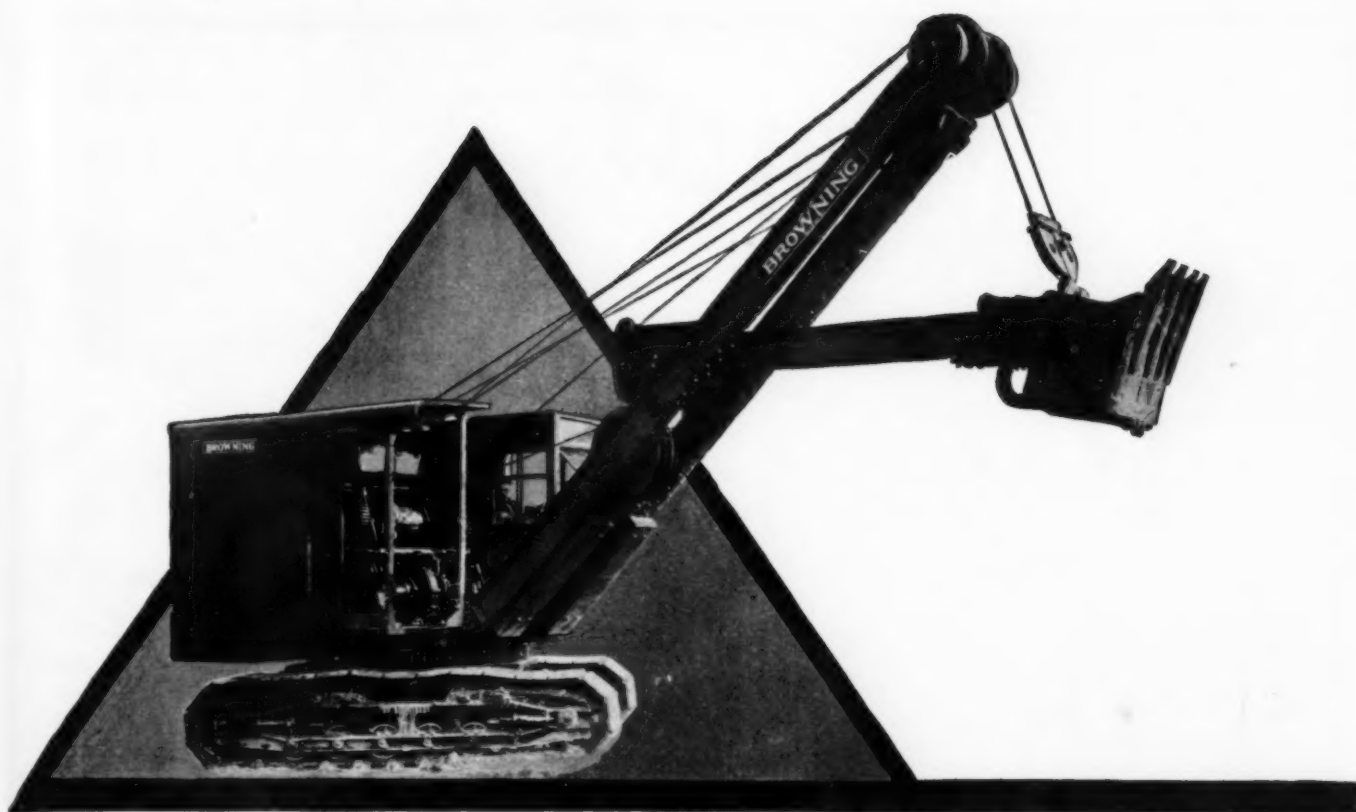
are preeminent in Construction.

Built in all sizes to do all hoisting jobs
faster and more dependably. Regularly
furnished with BAND FRICTIONS and
AUTOMATIC BRAKES.

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**THOMAS ELEVATOR
COMPANY CHICAGO**
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5/8 YARD SHOVEL

A NEW and finer gasoline shovel . . .
 a fast, powerful digger . . . built to
 "stand the gaff" . . . goes anywhere under
 its own power . . . steers easily from the
 cab . . . quickly convertible to crane, trench
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For complete details, specifications and
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If your equipment requires wire rope of more than ordinary stamina—rope that stands bends as well as heavy loads—that is elastic as well as tough—that will not crush easily—it will pay you to specify Yellow Strand Rope, made of specially drawn steel wire of genuine Swedish base. Get Catalog 47.

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The overwhelming choice of the builders of high quality equipment. Favored by contractors everywhere.

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Sabin Co., Gloves.
536-40 W. Federal St., Youngstown, Ohio.
Send me information on Sabin Gloves.

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You've never put your hands in more comfortable gloves—nor owned a pair that stands up like Sabins.

Their palms of grey buffed cowhide with outseam mean comfort for the palms. The holdtight back keeps them from falling off.

Price \$1.50 per pair. Send cash, check or money order for a pair and get acquainted with Sabin's gloves.

Sabin Co.—Gloves
536-40 W. Federal St., Youngstown, Ohio



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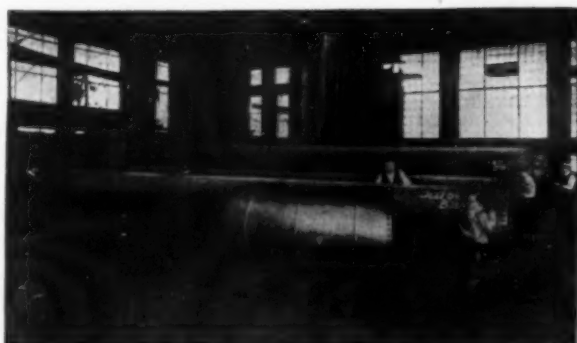


Biggs Helps You— Get the Job and Do the Job

When you go after a steel pipe project, take Biggs along. You then have on your side an ally with years of knowledge and experience in all that pertains to the subject of steel pipe, both welded and riveted.

Biggs stands ready to furnish you the technical data and information which will help you secure the job. Having secured it, you can further turn over to Biggs the complete responsibility for laying the pipe and for handling such details as are involved. You may depend upon Biggs service to account for all the little things essential to completing the installation quickly, economically and satisfactorily.

When the next pipe project comes up, give the Biggs organization an opportunity to work with you.



Inspectors for New York, Detroit, and Boston, approving sections of Biggs welded steel pipe after test. Diameters, 36 in. to 72 in. The contracts involved approximately 50,000 feet of electrically welded pipe for installation on major projects in those cities.

THE BIGGS BOILER WORKS COMPANY
Kent Street and Case Avenue,
New York Detroit Chicago

BIGGS

Steel Pipe
Riveted and Welded



Biggs 30 in. diameter Electric Welded Steel Pipe installed for Department of Water Supply, Gas and Electricity, New York City. Job 7900 ft.



Biggs 42 in. diameter Electrically Welded Pipe being installed for the City of Detroit, Dearborn project.

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Welded Steel Pipe	Tunnel Shields
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Steel Plate Construction of Every Description	

Biggs Welded Steel Pipe

Biggs Welded Steel Pipe, with its smooth interior and maximum structural strength, insures safe, economical, permanent conduit. It withstands more distortion and stress than any other type. It affords maximum carrying capacity. It guarantees uninterrupted service and minimum maintenance, especially under severe conditions. *The Biggs weld is stronger than the plate itself.*

Biggs' facilities and service are presented photographically in "Unusual Steel Plate Construction." This folder is yours for the asking. Mail us the coupon below.

The Biggs Boiler Works Co.
Kent Street and Case Avenue, Akron, Ohio.
Send us "Unusual Steel Plate Construction".



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TEMPLE & CRANE, INC.

CONSTRUCTION

EDWARD H. TEMPLE, JR.
GEORGE A. CRANE

CHAMBER OF COMMERCE BUILDING
BOSTON

March 17, 1930.

Mr. T. F. Moore, President,
Moore Trench Machine Company,
Rockaway, N. J.

Dear Mr. Moore:

Our recent contact with your Company was so particularly satisfactory that it deserves a letter of appreciation from us.

The new Power House at Bristol, Conn., for the New Departure Manufacturing Company offered a water problem which was most successfully met by the use of your Wellpoint System. The site was covered with ground water when we took possession and previous studies had indicated the presence of innumerable springs in the area which we had to excavate for a minimum depth of about 22'. The material was of fine sand which became decidedly "quick" as the excavation went down.

The use of Steel Sheet Piling and Pumping might have been successful but without doubt considerable time and expense was saved by the use of your wellpoints.

We followed the recommendations of your engineers as to the details of installation and found no occasion to change them in any way as the work developed.

The system not only removed all water but gave us a compact bottom on which the steam shovel could operate successfully in the deepest excavation. It minimized the sheeting requirements and proved of considerable advantage in the shoring of the bank which supported adjacent Railroad tracks.

The results certainly met all expectations, and confirmed our opinion gained from previous experiences.

Yours very truly,

Temple & Crane, Inc.

by *Edw. H. Temple, Jr.*
Edw. H. Temple, Jr., Pres.

ENT, JR/2

MOORE TRENCH MACHINE COMPANY, Rockaway, N. J.

AS ALWAYS

Satisfactory contact.

Site covered by water.

Springs and quicksand.

Sheeting saved.

Time and expense saved.

All water removed.

Compact bottom for shovel.

Railroad tracks supported.

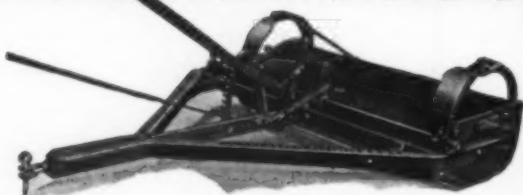
Met all expectations.

"MORETRENCH"

That's all.

Thank you, Mr. Temple.

BUILT TO STAND THE GAFF



THE "GROUNDHOG" Revolving Tractor Scraper

Makes Heavy Duty Dirt Moving Fast,
Easy and Economical

For Every Dirt Moving Job

Road Grading—Municipal Air Port Construction—Golf Courses—Parks—Real Estate Developments—Irrigation Projects—Filling and General Leveling Operations. A time and money saver for the busy contractor.

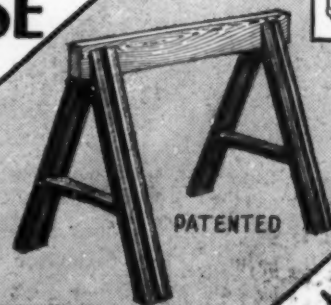
Works fast—the depth of cut is always under control—loads and spreads—or dumps, under forward draft. The ideal equipment for the busy contractor.

No.	Width	Capacity
4A	4 ft.	3/5 yd.
5A	5 ft.	1/2 yd.
5B	5 ft.	1 yd.

THE RODERICK LEAN CO.

Dept. CM; MANSFIELD, OHIO

TOLEDO Folding Steel HORSE



PATENTED



For barricades, manhole protection, detour signs—for every type of barrier and a store of other purposes, use the quickly erected, economical TOLEDO Folding Steel Horse—strong, rigid, easily handled.

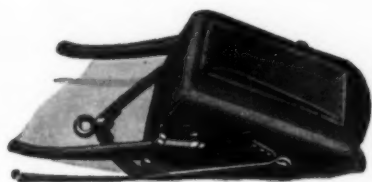
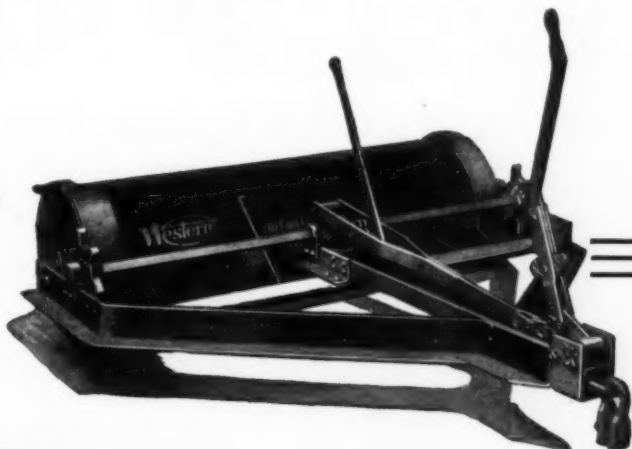
If your dealer can't supply you, write us for prices.



The Toledo Pressed Steel Co.
TOLEDO OHIO

Save with Steel

Western Rotary Fresno, made
in 2 sizes.



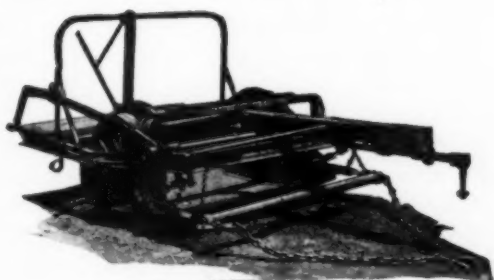
Western Drag Scraper made
in 3 sizes.



Western Fresno Scraper
Made in five sizes



Western Wheeled Scraper
Made in five sizes



Western Tumblebug Scraper
Capacity, 1 cubic yard

Use Western Tools for your Short Haul Work

Western short haul tools have been the contractors' standard for many years, some being originally designed over 50 years ago. It is not on past performance that Western equipment has gained its reputation. It is today's performance and the continuous improvement that has kept them abreast of the times that is responsible for their high standing.

The scrapers shown on this page are designed for specific purposes. They have ample strength to do the work they may be called upon to accomplish and will do it quickly and easily.

Catalog 29ED thoroughly explains the working range and the many unique features of the entire line of Western small tools. Where shall we mail your copy?

Western Wheeled Scraper Company
Aurora, Illinois, U. S. A.

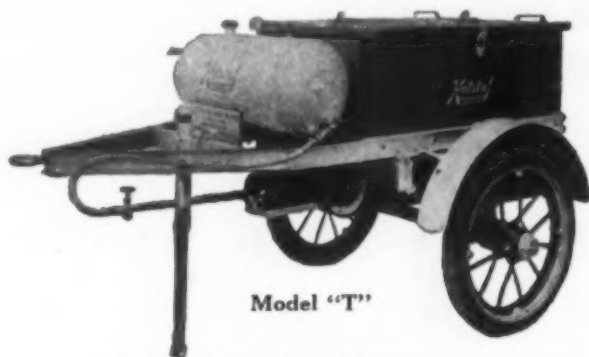
WESTERN



Can You Use an Extra \$6.00 plus Profit per Day?

That's the added profit that HOTSTUF owners make daily on a crew of 5 men.

Based upon a crew of 5 men at \$4.00 per day per man and using 150 working days per season there is a time labor saving amounting to \$900.00 per year over any other heater on the market. Plus a fuel saving of 30% or 48 cents per day. A fuel saving for the season of \$72.00.



Model "T"

The Patented Elevated Melting Chamber accounts for this greater efficiency and extra savings.

Multiply \$972.00 by the number of HOTSTUF Heaters to be used and you have added many extra thousands of dollars profit to your work.

The MOHAWK HI-SPEED TRAILER is an all steel box especially designed to meet the requirements of the progressive contractor. Compartments, fittings, partitions are all worked out from the practical suggestions of the men on the "firing line". Made of heavy steel. All seams are electrically welded. Double covers are waterproof and can be locked down. Made in 6, 7, and 8 foot lengths.



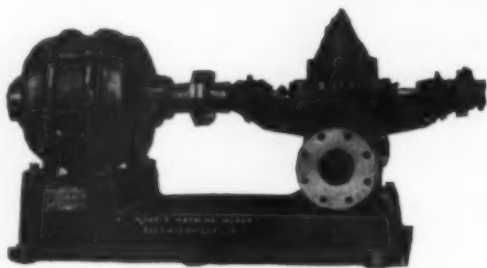
Write today for Catalog No. 12. It tells the HOTSTUF story.

MOHAWK ASPHALT HEATER CO.

62 Weaver St., Schenectady, N. Y.

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CENTRIFUGAL PUMPS



MORRIS PUMPS are made in all desirable types and sizes, motor, steam or gasoline engine, belt or chain drive, for domestic water supply, boiler feeding, circulating, irrigating, drainage, sewage disposal, hydraulic dredging, sand production and conveying, handling clean, dirty or acid water, etc.

Many popular types and sizes constantly in stock, and special designs built for unusual head, speed or capacity conditions. The advice of our Engineers on any pumping problems is free for the asking. Write for literature.

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Originators of Centrifugal Pumps, both Single and Multi-Stage, and builders for practically all purposes since 1864.

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Canada: Storey Pump & Equipment Co., Toronto.



A Sensational Performer and Money Saver

THE speed, versatility, rugged construction, big yardage and low cost of the Fundom combination shovel, ditcher and crane, make it a sensational performer and money saver.

It makes small jobs profitable. Fast, full $\frac{3}{4}$ circle swing, $\frac{1}{3}$ yard dipper capacity, $16\frac{1}{2}$ foot radius, gasoline power.

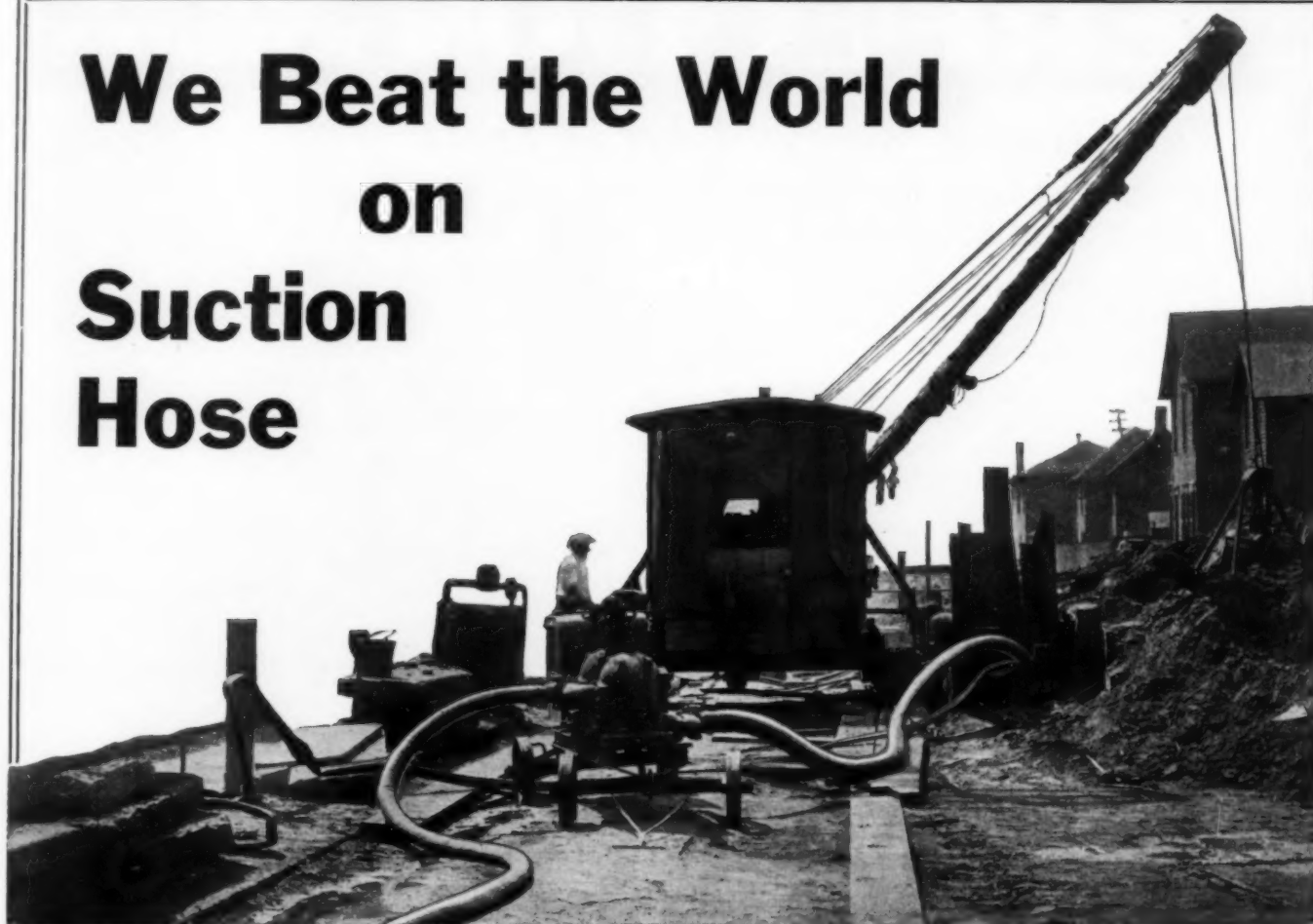
With Trench Hoe attachment for ditching or Boom Extension for clamshell, dragline or crane, the Fundom is an unbeatable three-in-one digging machine.

Get the details and name of nearest dealer. Address—

The Fundom Hoist & Shovel Co.

314 Central Building, Lima, Ohio

We Beat the World on Suction Hose



CONTINENTAL SUCTION HOSE

"Not the Cheapest but the Best"



Smooth Bore

These Constructions
are the Secret
of long life and
flexibility



Rough Bore

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TOLEDO, OHIO.....415 Michigan St.

DAYTON, O.....122 So. St. Clair St.
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Continental Rubber Works, Erie, Pa.

C. C. Kerner, 152 Chambers St., New York, N. Y., Exclusive Foreign Representative

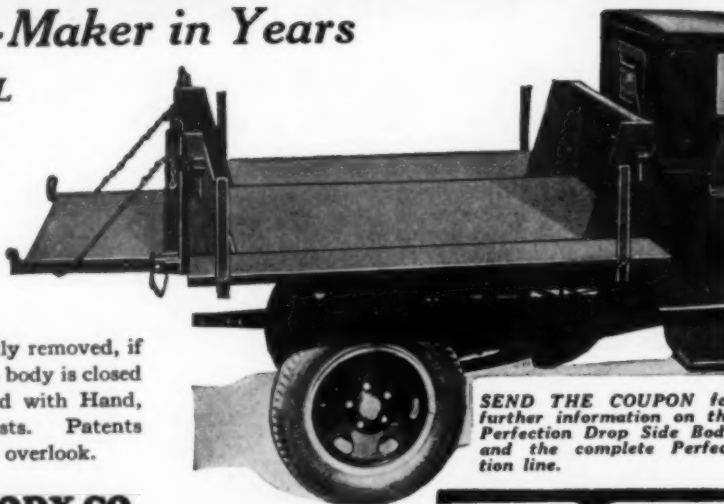
PERFECTION DUMP BODIES

The Greatest Money-Maker in Years

THE PERFECTION ALL-STEEL DROP SIDE DUMP BODY

With its many new and modern improvements virtually eliminates competition.

A Dump Body of ample capacity that may be quickly converted from a tightly closed body to a wide, open platform. Sides may be quickly removed, if desired. Sturdy, collapsible stakes fold in when body is closed and do not interfere with loading. Equipped with Hand, Gravity, Combination and Mechanical Hoists. Patents pending. Here's something you can't afford to overlook.



SEND THE COUPON for further information on the Perfection Drop Side Body and the complete Perfection line.

THE PERFECTION STEEL BODY CO.

Dept. C.M.
Galion, Ohio, U. S. A.

PERFECTION
DUMP BODIES

The Perfection Steel Body Co., Gallion, Ohio, Dept. C.M.
I am interested in further information on the New Perfection Drop Side Dump Body.

Name.....
City.....
State.....



Fultex Waterproofed TARPAULINS & TENTS

Protection against weather-damage at low cost. "FULTEX" Khaki Waterproofed tents, tarpaulins and windbreaks—serviceable for every purpose—quality at moderate price. Burlap—in bale or made-up covers—for protecting green concrete.

Makers of famous "SHUREDRI", "DFMP", "USAMP".

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Manufacturers Since 1870

FULTON BAG & COTTON MILLS

ATLANTA · BROOKLYN · DALLAS · ST. LOUIS
MINNEAPOLIS · NEW ORLEANS · KANSAS CITY KAN.



200 Ton
Hydraulic Press
With
Hand Pump

The Accumulator
Shown Is to Check
the Gauge
Readings

You Can Prevent Concrete Failures

Frequent compression tests are not only now required on all large contracts, but are absolutely essential from a standpoint of safety.

The illustration shows one of our 200-ton hydraulic presses arranged especially to test concrete test cubes, cement, stone, etc.

We also build Jacks for underpinning and heavy lifting; Bending Presses for bending pipe, bars, etc. Shears for reinforcing bars; Punches for structural shapes, etc.

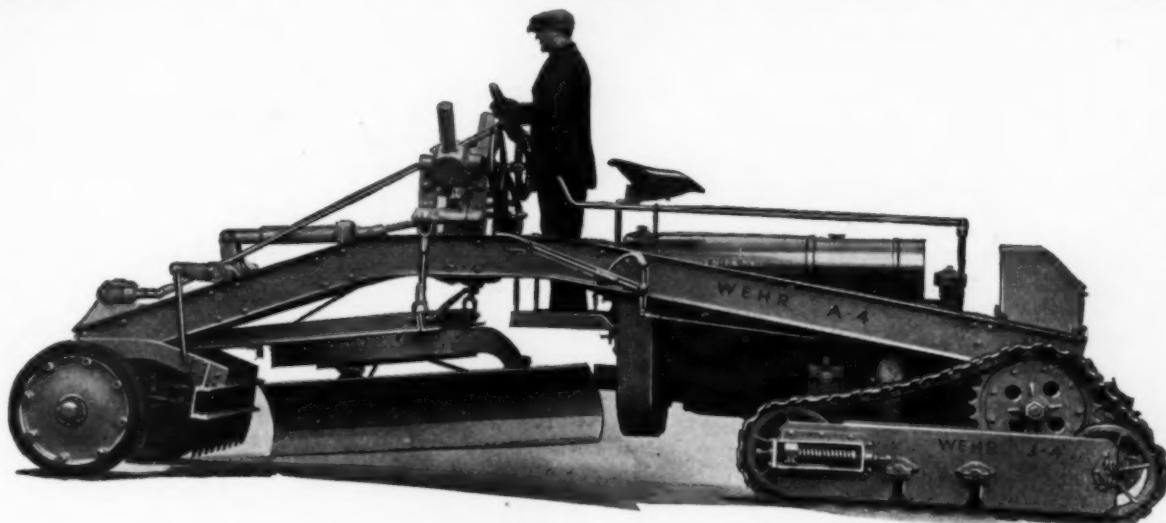
Write for Bulletins

THE WATSON-STILLMAN CO.

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Cleveland, Penton Bldg. Detroit, 6565 Russell St.
Pittsburgh, Union Trust Bldg. St. Louis, 705 Olive St.
Houston, Union Nat'l Bank Bldg. Atlanta, Forsyth Bldg.
Birmingham, 321 Brown Marx Bldg.

NEW

...from the ground up!



... the new Wehr A-4 Center Control Grader

Eight years of engineering development—eight years of constructive suggestions from ten thousand Wehr users all over the world—this is the structural background for the newest Wehr Grader!

Every essential demanded in a grader for modern highway work has been built into this outstanding Wehr product. Control and operation have been made as easy and effortless as possible. Scientific distribution of weight produces more power at the working points, and holds the grader to a true and steady course. Equipment is *complete* in every detail.

Note this partial list of specifications. A tool box, lateral adjustment of blade, control of scarifier from platform, four-speed transmission, circle and ramshorns that *cannot* come loose, all moving parts run in oil. Side frame 9-in. channel members, rigidly trussed with eight tubular and channel members, blade adjustment 22 degrees forward and backward, "A" frame so strong and stiff that it *cannot* buckle or weave, and a long list of other features.

If you want to know *all* the detailed advantages of the New Wehr A-4, write for complete list of specifications today.

WEHR COMPANY, Milwaukee, Wis.
(Factory at Cudahy, Wis.)

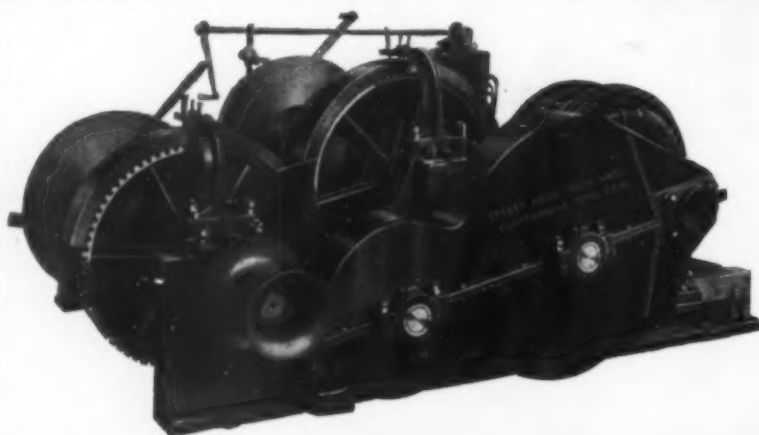


WEHR

**Road Building and
Maintenance Equipment**

The new Wehr A-4 Grader is powered with the McCormick-Deering tractor. This job can also be supplied with Case, Fordson or United Tractor Power Plants. This model can be furnished with the new Model J-4 Wehr Crawlers or Wehr All-Purpose Wheels.

The steering gear on the A-4 will last the life of the grader. A child can operate the gear shift, the efficient brake stops this 10,000 lb. machine dead on the spot, the blade and scarifier wheels can be spun either up or down. This is a great new grader—write for all the facts today!



STREET HOISTS

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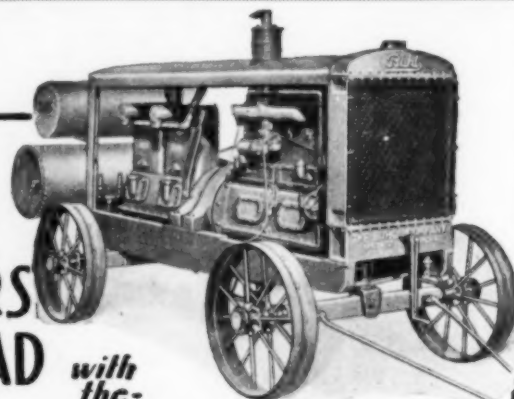
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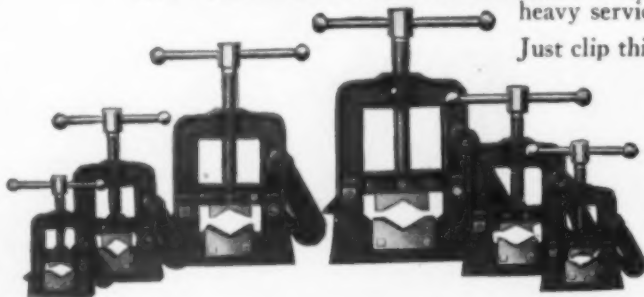


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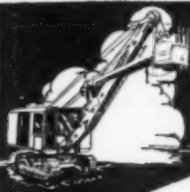
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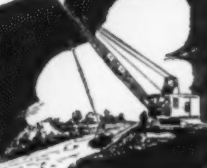
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Of Construction Methods, published monthly at New York, N. Y., April 1, 1930.
State of New York)
County of New York) ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared C. H. Thompson, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers of Construction Methods, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication, for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

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(My Commission expires March 30, 1931.)

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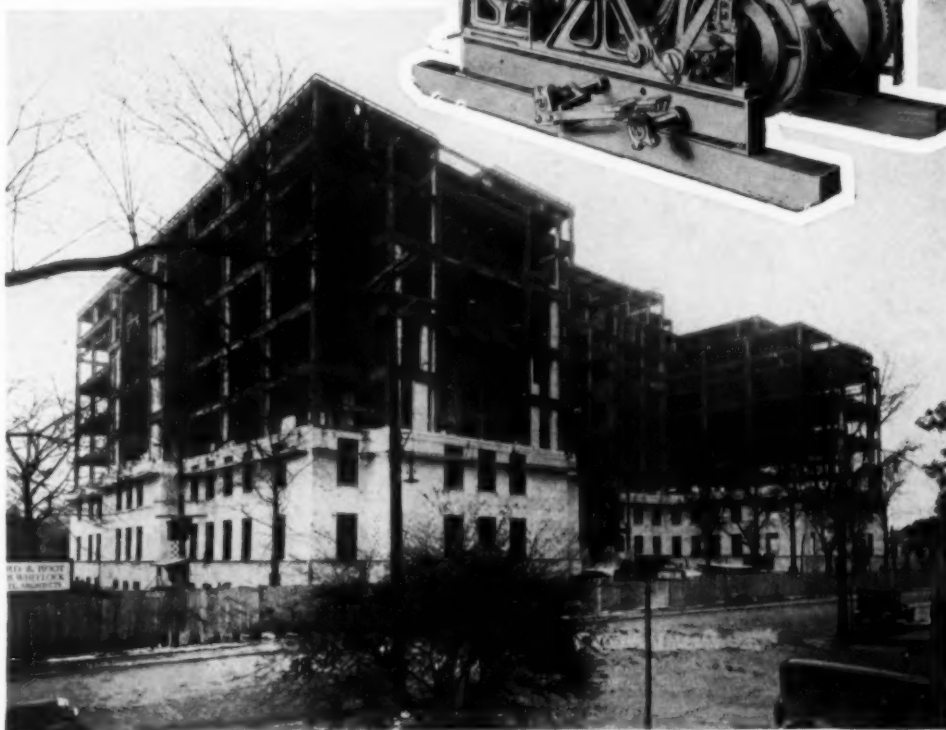
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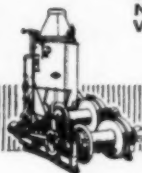
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